

COMPUTERWORLD

\$2.00 A COPY; \$44/YEAR

MAY 28, 1984

VOL. XVII, NO. 22



Special Report
on software
productivity
Handling the
application log-
jam/Follows 80

In Depth
Close-to-home
models of
management/49

The Big Eight
Should they
consent where
they audit?/19

Comdex accents dynamic growth in micro market

By Eric Bender
CW Staff

ATLANTA — Last week's Comdex/Spring '84 show here highlighted the continuing growth both in microcomputer sales and in the number of vendors serving that market. Of the 861 suppliers here, 188 exhibited products for the first time, according to the show's organizer, the Interface Group, Inc. of Needham, Mass.

Although final figures were not available at press time, the computer dealer show was expected to draw well over 45,000 attendees.

As at last November's Comdex/Fall '83 show in Las Vegas, IBM Personal Computers and compatible machines again this year dominated the exhibit floors. The most prominent contender outside the IBM-compatible fold, Apple Computer, Inc.'s Macintosh, maintained a low profile. Although a number of suppliers introduced hardware add-ons for the Macintosh, few application programs were on display.

With a string of major products announced in the weeks before the show, high-visibility product introductions were scarce. Much interest centered on integrated software packages, with Ashton-Tate's Framework and Lotus Development Corp.'s Symphony drawing the greatest attention.

As usual, several new personal computers claiming IBM compatibility made their debut. Corona Data Systems, Inc. introduced the Personal Best, an Intel Corp. 8086-based microcomputer. The system reportedly extends the upper range of Corona's hard disk personal computers, offering additional internal memory, floppy-disk-based storage and upgraded display abilities.

A version with two 5¼-in. floppy disk drives, one 10M-byte hard disk drive and

See COMDEX page 8

TOP OF THE NEWS

Older may be better if you're in the market for a mainframe. Now that IBM has cut upgrade prices and has added a performance improvement option, the older versions of the IBM 3090 line might be a better deal than the new X models. Page 2.

Information systems managers get involved in their companies' personal computer acquisition processes only as in-house technical consultants, a survey found. Page 4.

Raytheon Co. is terminating its Raytheon Data Systems Division, a decision that came as a surprise to industry analysts. Page 5.

Charleston gets ready for July 16: Eight long-distance telephone carriers — AT&T, MCI Communications Corp. and GTE Corp. — are waging a media war to sign up new customers in the West Virginia capital before the equal-access rule takes effect. Page 11.

A package for Comtex users was made available to the divested Bell operating companies by AT&T Technologies. Page 81.

Newly arrived in the U.S. is Honeywell, Inc.'s DPS 4, which the company said offers a growth path for Level 62 users. Page 88.

A sour deal for Apple dealers? They aren't happy about the vendor's plans to sell Macintoshes to 24 colleges and universities. Page 101.



Study points to DP fraud at banks, insurers

By Peter Bartlett
CW Staff

NEW YORK — A study of survey data involving 5,137 banks and 854 insurance companies revealed 118 cases of rigidly defined electronic data processing fraud, with perpetrators identified from "almost every aspect of corporate operations, with the preponderance outside the [DP] area."

Those findings were discussed in the "Report on the Study of EDP-Related Fraud in the Banking and Insurance Industries," issued here by the American Institute of Certified Public Accountants and based on the efforts of the Institute's EDP Fraud Review Task Force, appointed in 1979.

Following unsuccessful initial efforts to examine the nature and pervasiveness of such fraud, the task force undertook two surveys, one of banks and one of insurance companies, and focused on specific reported fraud cases. The task force noted that it made no projections on the number of fraud cases in the industries and "was aware of some significant cases that were not reported through the surveys and could, therefore, not be included in the study."

The surveys indicated that clerical employees were the most frequent perpetrators of fraud in both industries, but that management and supervisory-level personnel tended to be responsible for the larger frauds that were studied. Systems and applications programmers and operators were moderately prominent in banking frauds, but less prominent in insurance, according to the report.

The report identified 85 banking cases, with 58 perpetrated by clerical personnel, 17 by managers, 18 by DP staffs, eight by tellers and nine by others. Of the 34 insurance cases, 21 were committed by clerical

See FRAUD page 4

TRENDS & DIRECTIONS

Big systems users discovering the strengths of Unix

By John Gallant
CW Staff

Not surprisingly, the programmers and software engineers at Internix, Inc. fully supported management's decision to migrate to the Unix operating system.

Internix currently utilizes Andahl Corp.'s Universal Timesharing System, a version of Unix that is running under IBM's VM operating system on an IBM 4341 Model 2 processor. That mainframe is the host system for about 16 programmers developing an Ada language compiler for the U.S. Air Force.

Internix shifted its development efforts from IBM's MVS environment to UTS in March 1983. As with most large-system Unix shops contacted recently by Computerworld, Internix runs few end-user applications under that multi-

tasking, multiuser operating system. Rather, the focus is on software development at the Cambridge, Mass.-based firm, and for this, Unix provides the ideal working environment.



See UNIX page 10

AT&T and the scientific and educational communities have long embraced Unix as a key weapon in their data processing arsenal, and until recently, the operating system was primarily cloistered in those and other niche markets. These days, however, Unix is increasing-

ly in the limelight.

A variety of vendors has recently introduced Unix software products or has upgraded existing offerings. Newly competitive AT&T has thrown its considerable weight behind Unix with its System V release. Even IBM put a limited seal of approval on Unix with the recent release of a version for its Personal Computer XT.

Originally written for Digital Equipment Corp.'s early PDP-7 minicomputer, Unix was envisioned as bridging the functional chasm between computers by offering complete program portability. Everything from micro to mainframes would be a viable host for Unix, and applications would be utilized across the entire range of processing equipment.

But even its supporters lament: Unix's

See UNIX page 6

303 N. NEEDHAM ST.
ANN ARBOR MI 48106
UNIVERSITY MICROFILMS
SERIALS ACQUISITION
300 N. ZEEB RD.
ANN ARBOR MI 48106

NEWSPAPER

NEWS

Older IBM 3080s may be better deal than X models

By Tom Ichniowski
CW Staff

While the X models of IBM's 3080 series mainframes offer newer technology and up to 14% greater internal performance than the earlier models, the processors replaced by the X models may be a better deal for users.

Users who stick with the older processors could save as much as \$400,000 off the purchase price of new X model processors, industry watchers contend. The reasons are price cuts in model-to-model upgrades and the new give-away performance enhancements announced recently by IBM [CW, May 21].

How the older processors offer better financial deals is somewhat complex. On a direct purchase price comparison, the newer X models appear to offer 2% to 6% better price/performance than the non-X models, noted Mike Chuba, an analyst with the Stamford, Conn.-based Gartner Group. But when IBM announced the X models, it also announced it would no longer actively market the non-X models to new users. Therefore, the only way to buy non-X processors is

either on the used market or through model upgrades from IBM. It is through the upgrade process that users can save money.

Appearing soon

When IBM announced the X model processors [CW, Feb. 27], it cut the model-to-model upgrade charges on the non-X 3080 series processors by as much as 10%. At the same time, as much as 10% of the maintenance fees were reduced 16% in order to bring them in line with the newer systems' maintenance fees. Both moves were obviously made to appease users of the older systems, noted Michael Geran, vice-president of research at E. F. Button Group, Inc. in New York.

At the time of the X model announcement, many industry watchers speculated that the residual value of the non-X models would suffer because they could not be upgraded to the newer models. Some industry watchers called the X model announcement a marketing coup because it seemed to squash the burgeoning used market for older 3080s. In what appears to be a second appeasement to users of older 3080 se-

ries systems, IBM two weeks ago announced an optional performance enhancement, which, for \$16,000, offers users of non-X models up to 6% greater internal throughput. The option is priced so that IBM cannot possibly make money on the offer, said Charles Greco, an analyst with Framingham, Mass.-based International Data Corp. (IDC).

By adding the performance upgrade to the already reduced model-to-model upgrade prices, users can develop a non-X system that operates in the same performance ballpark as the X processors, but at a much lower purchase price. For example, IBM lists a 3083 Model B processor at \$1,735,000. To upgrade that system to a 3081 Model K processor, a special discounted upgrade package is available for \$1,230,000. Add to that the \$16,000 performance upgrade, and the total price for a 3081 Model K processor is \$2,961,000.

By making the same upgrade on the newer X models, the total cost for a 3081 KK processor would be \$3,565,000, or \$284,000 more than the non-X equivalent. But an IBM spokesman pointed out that the X

models can offer as much as 8% greater throughput than similarly configured non-X models with the performance upgrade.

IDC's Greco contends that even by considering the performance difference, the non-X models wind up costing roughly 7% less than the newer X models. Furthermore, Greco noted that users who buy non-X model machines on the used market can get even greater savings.

So why is IBM offering such deals? Some analysts, such as E. F. Button Group, said it is not uncommon for IBM to beef up performance in the "twilight" of a processor's life cycle. Other analysts suggested that instead of holding what is commonly known as a "fire sale" on outdated hardware, IBM has valued its price cut in the latest performance upgrade.

Greco, however, speculated that IBM may be having problems with its innovative Thermal Conduction Module cooling units in non-X processors. IBM corrected the problem in the newer X models, Greco theorized, and now it is correcting the problem in the older non-X models through a mysterious performance upgrade.

AT&T makes expected filing for reduced MTS, Wats rates

WASHINGTON, D.C. — AT&T, as expected, filed a revised tariff on May 18 to reduce by an average of 6.1% its rates for Message Toll Service and Wats.

Local telephone companies also filed revised tariffs specifying their charges for providing access to the long-distance networks of AT&T and other interstate carriers.

Besides collecting from the carriers,

the local companies are imposing an access fee of up to \$6/line per line on business customers who communicate with local-exchange networks through multiple lines.

Rates effective May 25

The new rates filed by AT&T and the local telephone companies carried an effective date of May 25. The tariffs appeared to satisfy require-

ments laid down earlier by the Federal Communications Commission [CW, May 14]. The FCC said that if there were no problems, it would allow the tariffs to go into effect on May 25.

"We don't believe we will be able to earn the 12.75% rate of return" authorized by the FCC, said Morris Tansbaum, president of AT&T Communications, which is the division within AT&T providing interstate

communications services. His statement might mean the company will ask for a rate increase in the near future.

AT&T Communications, in a letter accompanying the tariff, said the 6.1% reduction in rates for international telephone service should be deferred until the fall, when the company intends to restructure its international rates.

NEWS SUMMARY

SPECIAL REPORT Software productivity/Follows 80

Few MIS managers become deeply involved in their companies' micro acquisition activities except when they are called upon to dispense expert technical advice, a survey found/4

Raytheon Co.'s decision to terminate its Raytheon Data Systems division came as a surprise to industry analysts/5

CW at Cambridge: No single operating environment is emerging to link integrated microcomputer software packages to each other or to other applications, a software consultant says... TeleVideo Systems, Inc. announced the Personal Mini to be together IBM Personal Computers... Industry analysts see Unix's future as an operating system standard for single-user microcomputers in doubt/8-9

The number of companies being considered to bring offices of the Senate into the information age has been narrowed to six/10

Nationwide long-distance telephone companies have mounted an extensive

media campaign in Charleston, W. Va., set to become the first area of the country to have equal access/11

Data base providers give some tips on incorporating their products into corporate information centers/12

CW at Ft. Worth: It's virtually impossible for Anheuser-Busch Co. employees to get their hands on microcomputers, but it's a situation that exists by choice... Users said fourth-generation languages could be used far more extensively by professional programmers/14-15

The director general of the Rome-based Intergovernmental Bureau for Informatics says that the U.S. must recognize its information responsibilities to the Third World/16

National Institute for Occupational Safety and Health officials are perched on the fence over the VDT safety debate, according to recent congressional testimony/17

CW at ICCA: Independent computer consultants voiced increasing concern over the impact on jobs that computer create... Independent consultants are unhappy about increasing

competition from Big Eight accounting firms/19

Minneapolis' decision to hire Systems and Computer Technology Corp. to study and restructure its DP department was a controversial one/22

What not to do when planning a distributed system was outlined at an MIT symposium on networked systems/25

Top executives should take immediate steps to evaluate and implement computer security procedures, a data security consultant told bankers/28

A study of firms in the Dayton, Ohio, area uncovered a disturbing lack of responsibility for the safekeeping of computer records/29

Banks can be among the leading players when videotex and home banking grow during the next two years, the American Bankers Association was told/31

A fourth-generation application development tool has enhanced programmer productivity for a major supplier of oil well services/32

Several departments at an aircraft man-

ufacturer now access integrated information via a networked data base/36

Productivity is the subject of a joint research venture between an Illinois bank and a productivity center in Houston/37

An insurance company began to cut its application backlog using a systems development and maintenance methodology/38

An on-line report generator is making a growing number of people at the University of Cincinnati hands-on users of the school's DP center/42

BMW AG's remote network oversees global financial operating functions and drives the firm's data management/44

Turnaround Time/36
Telecom Briefs/34
International Report/39
Calendar/47-48

EDITORIAL/54
SOFTWARE & SERVICES/71
COMMUNICATIONS/81
SYSTEMS & PERIPHERALS/85
MICROCOMPUTERS/93
COMPUTER INDUSTRY/101

ADR WARE™

ADR/IDEAL™

The only complete
4th generation system
integrated with a
relational DBMS, which
lets you develop appli-
cations for high volume
production, from the
simplest to most
complex.

We've taken state of the art to a new state: Easy and available.
Before you make a software decision, mail in the coupon below.
Or call in N.J. (201) 674-8000 or toll free
1-800-ADR-WARE.

- ☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name

Position

Company

Address

City State Zip

Phone Number

Computer Equipment

ADR WARE™

From idea to application,
we get you there faster.

NEWS

Apollo adds Lisp version on Domain

By Paul Gillette
CW Staff

CHELSEA, Mass. — Apollo Computer, Inc. today announced a version of the Lisp programming language that runs on the company's Domain series of workstations.

Domain Lisp is not intended to fit into the dedicated Lisp workstation market, but rather to be used for "practical applications," said Mark Hatch, Lisp product manager.

Hatch said that "it's only been just recently that applications of Lisp to artificial intelligence have started to pay off in terms of natural language systems and expert advisors." For example, Domain Lisp could be used to enhance computer-aided design applications to incorporate some problem-solving features.

Domain Lisp is said to be highly integrated with Apollo's Domain Language System, a line of languages and utility tools that includes Fortran, C and Pascal. The capability allows portions of programs to be written in different languages and then compiled into a single application. The language conforms to the Standard Lisp report of 1979 and is a compatible superset of the Portable Standard Lisp developed at the University of Utah.

The environment contains an interpreter for check-out and prototyping and an optimizing compiler. Apollo-based tools are available for Domain Lisp applications in the areas of expert systems, special-purpose graphics and robot vision software, a spokesman said.

Access to all operating system calls is furnished, as well as a history facility to record a session's interactions. Macro definition tools help convert existing Lisp programs to the Domain processing system.

Other features include save/re-store environment commands, "efficient compacting garbage collection" to maximize storage utilization, a cross-call language capability and a dynamically scoped binding environment, the spokesman said.

Systems support is provided by Apollo's demand-paged, virtual memory operating environment, which includes Apollo's Argus operating system and AUX, an implementation of Unix System III with Berkeley extensions.

The Domain Language System's common code generator separates pure, position-independent code from impure data areas, allowing all programs to be reentrant, the spokesman added. Multiple concurrent processes share common 1,024K-byte program pages.

Domain Lisp runs on all Apollo systems, including the DN300, the DN320 with floating-point hardware and the high-end DN440 and color DN500 workstations. Communications support includes IBM 3270 emulation and Houston Automatic Spooling Program, X.25 and Ethernet.

The language implementation is priced at \$1,850 per node and \$15,500 per site up to 100 nodes. Apollo is located at 15 Elizabeth Drive, Chelsea, Mass. 01824.

DP manager's role in micro buys limited

By Jeffrey Buehler
CW West Coast Bureau

LOS ANGELES — They seldom initiate their companies' requests for personal computers. Nor do they typically authorize the final purchases.

But information systems managers do contribute heavily to the personal computer acquisition process in at least one important respect: They rank among their firms' chief sources of advice about which of the many available microcomputer models is best suited to do a particular task.

That picture of where MIS directors fit into the corporate world's microcomputer procurement scheme emerges from the results of a recent survey conducted jointly by Arthur Andersen & Co. and Housahan/Parker Co., a market research firm. The survey examines how microcomputers are used and regarded in 308 companies, including more than 150 corporations with annual sales volumes averaging \$133 million.

The study's goals

One of the study's many goals was to find out at what level in the executive hierarchy the evaluation and selection of personal computers typically takes place. In large companies, decisions to acquire microcomputers are usually initiated by executive and financial vice-presidents, controllers or managers of end-user departments, according to the survey. In only 10% of the big corporations did purchase

requests originate with information systems managers.

MIS directors apparently exercise an even smaller voice in authorizing personal computer purchases. Among the survey's largest respondents, only 1% of the DP managers reported any involvement in final authorizations.

But although information systems managers are only minimally involved at the beginning and end of the personal computer acquisition cycle, they play a comparatively active role during the middle phase of the process.

Exactly 30% of the large corporations participating in the survey listed their MIS directors as one of their main sources for recommendations about which micro model to buy. Other major sources of technical advice about microcomputer systems include user department managers and financial vice-presidents.

In essence, then, the main role of information systems managers in the personal computer acquisition process is to serve large companies as in-house technical consultants, the survey showed.

Success and failure

In other results, the study found business microcomputers to be an "outstanding success" in most of their initial applications — but a comparative flop in subsequent tasks, according to Arthur Andersen partner Bob Leach.

Most end users, he said, buy microcomputers to solve a "single isolated problem." But the results often prove so "satisfying" that they soon try to add a second application or user to the system.

"That's usually when they begin stumbling into problems they hadn't foreseen at the outset," Leach said. When users start adding multiple applications to their personal computers, they cease to be "islands of automation" and "become part of a whole integrated information systems solution."

Demands networking skills

But the integration of microcomputers into existing systems demands networking skills that far exceed the technical competence of most inexperienced end users, Leach said. The result of this dearth of networking expertise is that shortly after establishing their initial beachhead in a company, microcomputers usually encounter a daunting technological barrier that slows their proliferation to a crawl or worse.

Leach's observations are borne out by the survey results, which show the current penetration of personal computers in the big business world to be broad, but shallow.

Although more than 70% of the large corporations that responded to the survey claimed to be using microcomputers, three-fourths of the companies had installed only 10 or fewer units, the survey indicated.

FRAUD

personnel, nine by supervisors and four by others.

"In almost all cases," according to the task force, "the fraud occurred during normal transaction processing cycles. . . . Fraud occurred in both batch and on-line systems."

The task force concluded that a variety of methods was used to conduct the frauds, but "few perpetrators used sophisticated techniques; many took advantage of weaknesses in the system of internal accounting control." A common weakness among the reported cases was inadequate segregation of employees' duties.

Losses ranged up to several million dollars, but a majority of the cases involved amounts of \$25,000 or less, according to the report. Most frauds were perpetrated in the input of data, where "perpetrators generally introduced or created unauthorized input or manipulated otherwise proper input."

Duration of fraud

The duration of time in which a fraud occurred varied from one day to several years. The task force found that "frauds perpetrated by supervisory or management personnel tended to last longer than those perpetrated by clerical personnel."

The primary objective of most perpetrators was to obtain money, but in some cases data was manipulated to show a better performance record. "For example, one bank loan officer extended due dates on loans to show a good record of loan collections."

One-third of the frauds was reportedly detected through normal accounting procedures or audits; an additional one-third was detected

"A variety of methods were used to conduct the frauds, but 'few perpetrators used sophisticated techniques; many took advantage of weaknesses in the system of internal accounting control.'" — EDP Fraud Review Task Force.

through routine events such as by accident, unusual activity of the perpetrator or a tip-off. In about one-fourth of the cases, the frauds were detected following a customer com-

plaint; virtually all of these cases were in the banking industry.

In banks, the most frequent type of fraud involved misappropriation of customer deposits. Other schemes included crediting loans to borrowers who never received the funds and making unauthorized extensions of credit limits and loan due dates.

The most frequently used scheme in the insurance industry was generating claim payments to the perpetrator or to his accomplices. Another prominent scheme was generating refunds or reductions of policy premiums.

The report is available free from the American Institute of Certified Public Accountants, 1211 Ave. of the Americas, New York, N.Y. 10036.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (6 issues), August (6 issues), September (6 issues), October (7 issues), November (6 issues), December (6 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Condit Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved. Computerworld can be purchased on 35 mm microfilm through University Microfilms Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Computerworld is indexed: Wels for electronic information.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to copyrighted articles followed by this symbol.

Special requests should be addressed to Henry M. Shannon, CW Communications/Inc., Box 880, 375 Condit Road, Framingham, MA 01701. ISSN 0010-4841/84 \$3.00 + \$0.50. \$2.00 in U.S. and possessions; \$4.00 in Canada; \$5.00 in Europe; \$11.00 in Japan; \$15.00 in all other countries — \$24.00 a year (annual service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.



POSTMASTER: Send Form 3576 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Condit Road, Framingham, Mass. 01701.

Raytheon Data Systems' demise surprises analysts

By Peter Bartelink
CW Staff

NORWOOD, Mass. — The decision by Raytheon Co. to terminate its Data Systems Division here shocked the business press and surprised analysts who expected the company to use Convergent Technologies, Inc.'s workstations to revitalize its sagging position as the top supplier of IBM 3270-compatible terminals.

Raytheon announced on May 18 that it would terminate the division because of difficulties in profitably manufacturing commercial data systems and because of delays in deliveries of purchased assemblies from suppliers. Raytheon spokesman A. Newall Garden said the company had anticipated Data Systems would market new products based on Convergent's engines.

Garden said the division, after determining that internal development was not moving ahead fast enough, "wanted to leapfrog" by purchasing Convergent equipment. "Convergent was later than they should have been, and we had slowed down to wait for their products," he said.

Signature 8200

Earlier this year, the Data Systems Division announced the Signature 8200, an office system based on Convergent's multiuser microcomputer and aimed at integrating the division's existing terminal and word processing businesses (CW, Jan. 23).

Raytheon said the Raytheon Data Services and Leasing Co. will provide service and software support for current users. Fewer than 100 of Data Systems' present employees are expected to join the new service and leasing company, while 1,600 employees worldwide will be phased out over the next few months, including some 660 based in Massachusetts. The Norwood facility will be occupied by Raytheon's Equipment Division.

Wall Street reportedly reacted positively to the news, with Raytheon stock staying relatively stable in the face of a broad decline. Data Systems contributed only about 5% of Raytheon's total revenues in 1983 and sustained a net loss of about \$23 million. For the first four months of 1984, the division lost \$6.2 million. Raytheon said it will absorb an estimated after-tax loss of \$6 million to accomplish the division's phaseout.

Once No. 1

Raytheon's Data Systems Division had for several years been the No. 1 supplier of terminals compatible with IBM's 3270 CRT terminal. At the end of 1982, according to International Data Corp. (IDC), a Framingham, Mass.-based research firm, Data Systems had an installed base of 176,150 Model 3270-type terminals, representing 9% of the market, behind IBM's 50% market share. Since then, however, it "had dropped down to third or fourth in terms of installed base," reported Frank Gens of the Boston-based Yankee Group.

The company was even less successful in the area of word processing, despite its 1978 acquisition of Lextron Corp., an early winner in the area of stand-alone word processors. According to IDC office automation analyst Molly Upton, "it was the old story where they bought a com-

pany, put in new management and couldn't put new products out."

Another IDC analyst, David Brown, said potential customers, following the acquisition, "couldn't identify with Lextron products anymore."

Raytheon's Data Systems Division has supplied, worldwide, more than 200,000 Model 3270-type terminals, with more than 100,000 in use in the airline reservations field. According to Gens, "That's great market penetration, but it increases your exposure if the [airline] industry is not doing well, as in 1982 and 1983."

Data Systems, Gens added, "was in a nasty situation for any business."

Its entire product line was going through a life-cycle transition."

The 3270-compatible terminal market has shifted dramatically in the past two years, Gens said. IBM brought out a lower-priced terminal, the 3178, and high-end products are being developed around microcomputers. As a result, the low-end of the 3270-type market "is a break-even business at best, but you have to have a presence in the low-end [market] to be competitive."

The profit for terminal manufacturers lies in products based around microcomputers compatible with IBM's 3270 Personal Computer, but there are twice as many competitors

in that area, Gens added.

It was this personal computer direction that Data Systems was expected to take with Convergent's products, Gens said.

Many vendors are positioned to grab chunks of Data Systems' potential market, according to the analysts.

"There are at least 20 companies in that market," noted Mary Lynn of IDC. She added that many vendors who were traditionally suppliers of communications products are now entering the market.

Heading the list of terminal suppliers are ITT Courier Terminal Systems, Telex Corp. and Monomex Corp.



48 New Enhancements in (FDR) Fast Dump Restore Ver. 4.8

48 new ways to upgrade your DASD management capabilities, efficiency and productivity — all part of our continuing commitment to our customers.

FDR Major New Features

- VSAM DF/EF Support
- ICF Catalog Dump and Restore
- Data Set Enqueue Option
- Compacting Active Volumes
- Using Disks or MSS as the Backup Volume
- %FREE Option

How Others See Us... and Report

May we refer you to the closing statement in DATAPRO 70 February 1984 — 70E-528-01c, Software Report, Subject — FDR/COMPACTOR/ABR, Innovation Data Processing Incorporated: "The general consensus of opinion is that FDR is the best product on the market, which is also reflected by the very large number of users, and, with the constant enhancements made by the vendor, it will probably remain in that position."

INNOVATION'S COMMITMENT TO THE FUTURE AND OUR 5000+ USERS —
"We'll Keep Working On Our Version of It, in '84... and Beyond."

Try 90 Days of FDR Free

For the DASD MANAGEMENT SYSTEM of your choice and a copy of the DATAPRO 70 Report, call (201) 777-1940 or write to:

| 48 New Features Totaled by Program | |
|------------------------------------|-----------|
| FDR Ver. 4.8 Enhancements | 5 |
| SAR Ver. 4.8 Enhancements | 3 |
| DSF Ver. 4.8 Enhancements | 9 |
| CPK Ver. 4.8 Enhancements | 11 |
| ABR Ver. 4.8 Enhancements | 20 |
| More in '84 | 48 |

INNOVATION
DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013

NEWS

UNIX from page 1

overall obscurity. Command names are cryptic, they say, and it lacks the so-called user-friendly features incorporated in other general-purpose operating systems. They question Unix's ability to handle high-volume transaction processing and its usefulness in supporting end-user applications without specifically tailored interfaces or front ends (see stories below).

Reservations not a barrier

Despite those reservations, an increasing number of large-system users are looking to Unix to handle specialized tasks, such as software development.

"We have found Unix to be the best development environment," said Intermetrics software engineer Abraham Shesler. "Unix offers a tremendous set of programming tools, including stream editors, source code control facilities and programs for configuration management. Its hierarchical file system also allows us to better organize projects. It gives people local areas in which to work. They don't have to know about all the other files in the system when they are working in those areas."

Shesler's comments were echoed by Bruce Hunter, senior software engineer and Unix system administrator for Interstate Electronics Corp. in Anaheim, Calif. Interstate develops software under military contracts for such applications as missile tracking. Under UTS, the firm supports a development staff of nearly 100 programmers and engineers on five virtual machines under IBM's VM operating system on an Amdahl 470V/7 mainframe.

Interstate's team relies heavily on Unix's ability to create "make" files, which automate the source file compilation and linkage involved in any major

software development effort. In addition, the staff utilizes what Hunter described as Unix's exceptional documentation facilities and the system's Source Code Control System (SCCS).

"SCCS keeps the number of versions of any program to one by maintaining an encoded history of the program since the date of its origination," Hunter explained. "It also allows you to reconstruct a program as it appeared at any point in its history. The lesser utilities, such as the facilities for comparing for differences in files and editing, are all novel parts of Unix's programming environment that we utilize every day." Hunter maintained that "there is really no comparison between Unix and conventional operating systems. Those systems can't begin to approach the versatility of Unix. They don't have the literally hundreds of built-in programming tools that Unix provides. It is an ideal system for people who are [oriented toward] programming or system management."

Best of two worlds

Running Data General Corp.'s MV/UX version of Unix under its A08/V8 operating system on an Eclipse MV/8000 superminicomputer, Charles Barnaby says he can utilize the best of two worlds. A simple instruction entered through the command line interpreter of A08/V8 allows Barnaby to access the Unix C shell and invoke any of Unix's utility programs.

Barnaby is vice-president of Berkeley Solar Group, a building energy and conservation consulting firm in Berkeley, Calif. In addition to its architectural consulting duties, Berkeley Solar's staff develops modeling and analysis software that is sold outright and offered through time-sharing on the MV/8000.

"As an environment for program development and text manipulation, Unix is very powerful," Barnaby said. "It has this amazing piping facility that allows you to string programs together very elegantly. You can take the output from one program and plug it into the input of another to set up

a series of operations."

Compared with IBM systems like TSO, Barnaby said, "Unix is miraculous. It gives me access to programs designed specifically for developing code."

But learning to use Unix is no small task, he added. "I'm taking advantage of Unix for maintaining source code, searching file strings — that type of thing. But I'm acclimating those tools out of A08/V8. The user interface to Unix is much inferior to the DG system. A08/V8 is much easier to use and learn, and it provides better error messages. It's clear that the marketing types never got hold of Unix to smooth it out for wider use."

Lee Steinbrenner, senior software engineer for ITT Courier Terminal Systems, Inc., countered that claim: "I think Unix offers better continuity throughout its entire command structure, compared [with] other operating systems I've worked with, including systems like TSO and CMS."

ITT Courier in Phoenix runs UTS on a National Advanced Systems, Inc. AS/9050 mainframe under IBM's VM/SP operating system. Developing switching system software for ITT Courier's IBM-compatible terminals and controllers, some 280 programmers and engineers in Steinbrenner's production development area use one or two virtual UTS systems under VM/SP. The software is written in C and cross-compiled to applicable micro-processors.

"The Unix environment is state-of-the-art," Steinbrenner said. "If you have a lot of people doing development tasks, Unix is a wonderful tool to work together on. In addition to software development, we plan to do some emulation and simulation work, maybe even some computer-aided design and manufacturing. We would use Unix as the front end for those applications."

With all the power and flexibility attributed to Unix by its users, why does the operating system enjoy only limited popularity at the high-end?

"Unix has been a fairly unstable system; it's changed a great deal in recent years," said Intermetrics' Shesler. "It has been the stable environment that is really needed for application development."

Moreover, he said, "Efficiency is part of the reason. Unix will never be as good as a system that has contiguous files and better batch processing capabilities."

How useful Unix? End users divided

Unix is seen by some as the ideal environment for software development, but users are divided over its usefulness as a proper support for end-user applications.

According to Charles Barnaby, vice-president of the Berkeley Solar Group in Berkeley, Calif., the operating system's functions are often confusing to time-sharing clients who want to develop applications or access programs on Berkeley Solar's Unix-based Data General Corp. Eclipse MV/8000 superminicomputer.

"Unix is basically written for computer professionals and, to a large degree, it is overhyped for the man in the street. I wouldn't take on the task of teaching someone to use it," Barnaby said.

Furthermore, "most heavily loaded Unix systems are quite slow, and that makes them inappropriate for transaction-oriented applications."

User difficulties can be circumvented by simply designing an interface — or front end — that hides the operating system, according to Bruce Hunter, Unix system administrator for Interstate Electronics Corp.

"You must develop a software interface that makes Unix so it doesn't become apparent to a user accessing an application. That type of user-friendliness is up to the systems programmer to provide. But it is just as easy to provide that friendliness under Unix as it is with any other operating system," Hunter said.

Fry & Saxe, Inc., which operates a chain of more than 300 retail outlets, is currently installing NCR Corp.'s Unix-based Tower 1632 minicomputers in its West Coast stores. Programmer Paul Barkham is part of a design team that is developing applications for those processors on the company's main Tower system at its Seattle headquarters.

"We have quite a few end users on the system, and they don't even know what Unix is. When they log on, we shunt them straight into our Cobol-based applications," Barkham said.

Packages for Unix no problem now

The perception that few software packages are available for use with Unix is an outdated one, according to Bruce Hunter, Unix system administrator for Interstate Electronics Corp.

"There is an awful lot of good software that has found its way into the Unix marketplace," Hunter said. "In the past couple of years, many companies have developed a large number of packages in assembly to programming primarily in higher level languages, such as C and PL/I. That makes the software extremely easy to port to Unix."

Lee Steinbrenner, senior software engineer for ITT Courier Terminal Systems, Inc., agreed that there is no lack of Unix-compatible third-party software. "However," he added, "we are running [Amdahl Corp.'s] UTS, so a lot that is available has to be ported to that version of Unix. We either have to buy the source code or convince the vendor to do the port for us."

"That can be a problem sometimes," Steinbrenner said, "but most vendors are quite willing to provide the source code, and the porting itself is a very simple task."

Abraham Shesler, software engineer for Intermetrics, Inc., said his firm makes use of an informal network of Unix users to obtain information on available software. "We utilize the so-called 'notes' network, which is a loose communications network that operates over telephone lines between literally thousands of Unix systems. You can put in a request for a certain type of software, and somebody on the network will usually send you information or even the source code to a program they have already written."



On page 10, H. Pong

tems I've worked with, including systems like TSO and CMS."

ITT Courier in Phoenix runs UTS on a National Advanced Systems, Inc. AS/9050 mainframe under IBM's VM/SP operating system. Developing switching system software for ITT Courier's IBM-compatible terminals and controllers, some 280 programmers and engineers in Steinbrenner's production development area use one or two virtual UTS systems under VM/SP. The software is written in C and cross-compiled to applicable micro-processors.

"The Unix environment is state-of-the-art," Steinbrenner said. "If you have a lot of people doing development tasks, Unix is a wonderful tool to work together on. In addition to software development, we plan to do some emulation and simulation work, maybe even some computer-aided design and manufacturing. We would use Unix as the front end for those applications."

With all the power and flexibility attributed to Unix by its users, why does the operating system enjoy only limited popularity at the high-end?

"Unix has been a fairly unstable system; it's changed a great deal in recent years," said Intermetrics' Shesler. "It has been the stable environment that is really needed for application development."

Moreover, he said, "Efficiency is part of the reason. Unix will never be as good as a system that has contiguous files and better batch processing capabilities."

Savvy Unix people don't come cheap

Software development under Unix requires personnel with experience in the use of this operating system — experience that is often hard to find and costly to employ.

"If you want good Unix people, especially at the administrative level, you've got to be willing to pay for them," said Bruce Hunter, Unix system administrator at Interstate Electronics Corp. "It's a scarcity situation. For example, systems programmers with Unix backgrounds command premium pay."

Interstate, which migrated to Amdahl Corp.'s version of Unix in September, initiated a massive education program to acquaint some 60 programmers with Unix after installing it. For out-of-house Unix experience, Hunter looks to recent college graduates.

"For new hires, the best source of people is the colleges. The graduates are already experienced in Unix. They don't have to be reeducated, they just have to learn the idiosyncracies of our dialect of Unix," Hunter said.

For Lee Steinbrenner, senior software engineer for ITT Courier Terminal Systems, Inc., filling an opening in his Unix-based software development area takes a minimum three months, on the average. "We face a real problem finding personnel with Unix experience. There are very few qualified people available to fill the slots we have open."

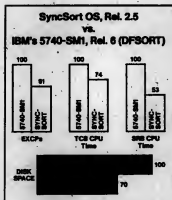
Thoroughbred

Meet the newest champion in the world's greatest sorting stable!

(SyncSort OS 2.5)

Call (201) 568-9700.

Find out why it takes a SyncSort to beat a SyncSort.



syncsort
INC.

Here we go again—improving the Sorting Breed!

That sleek young thoroughbred out in our main paddock is SyncSort OS, Release 2.5. It's by SyncSort 2.4 out of that celebrated brood mare, High Technology. And it's destined to win a lot of prizes on OS/VS and MVS/XA tracks.

IMPROVING THE UNIMPROVABLE: Until now, SyncSort 2.4 was the best OS/VS sort program ever bred. It was far faster than any IBM sort. And it was easier to use, too—thanks to a tack-room full of advanced features.

SyncSort 2.4 probably could have continued to win prizes for years. There was only one catch—it wasn't good enough for us.

PICKING TOMORROW'S WINNERS: We knew that new hardware and software systems would create opportunities for evolution of advanced sort programs. Speed would still be essential. But productivity would continue to skyrocket in importance. So that's the way we bred 2.5.

FASTER SORT PERFORMANCE: We've added new sorting techniques to SyncSort 2.5 to make it the only sort that outperforms 2.4. You can expect savings in critical resources—up to those shown at lower left. And that can add up to a big increase in total systems throughput.

NEW PROGRAMMER PRODUCTIVITY FEATURES: As any seasoned sort-watcher knows, there's a lot more to data handling than sorting. SyncSort 2.5 introduces a Data Utility set that applies its proven techniques to a wide range of processing and reporting jobs.

For example, with a single execution, 2.5 can sort, format and present data in virtually any form you want:

- **SortWriter**—a powerful tool that can produce extensive reports as a by-product of your normal sorting—without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting**—To existing features like INCLUDE/OMIT, INREC/OUTREC, SUM and others—all of which have been expanded—2.5 adds new and useful capabilities like data conversion, editing, insertion of literals.
- **Multiple Output**—From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

If you're tired of betting on sort programs that empty your pockets of resources and are tough to handle, give us a call. We'll arrange to have SyncSort OS 2.5 run a few furlongs on your own turf.

Syncsort Incorporated • 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

Common micro environment seen lacking

Analyst cites flood of unlinked software packages



CW AT
COMDEX/Spring '84

By Eric Rowland
CW Staff

ATLANTA — Despite the flood of integrated microcomputer software packages, no single, standard operating environment has emerged to link those packages to each other or to other applications, software consultant Esther Dyson of Adventure Holdings, Inc. commented here last week.

A standard operating environment would integrate programs from numerous vendors, providing common user interfaces and data transfer procedures, Dyson said during a session at Comdex/Spring '84.

This approach will offer important benefits for both users and software developers, but next-generation integrated products, like Ashton-Tate's Framework, are coming to market without being designed for a common environment, according to Dyson.

Microsoft, Inc.'s Windows, often seen as the most likely candidate to serve as a standard operating environment, has been plagued by development delays, Dyson observed. "Windows would have been a good standard if it were not too late," she said.

Because Windows has dragged be-

'Windows would have been a good standard if it were not too late.'
— Esther Dyson, Adventure Holdings, Inc.

yond its announced April shipment date to developers, many software firms have decided to take their own approaches, she added.

VisiCorp's Vision, shipped last December, also has been positioned as a standard environment "and probably offers the greatest integration," according to Dyson.

To complicate matters further, she said, some new integrated packages, such as Lotus Development Corp.'s

Symphony, although not billed as operating environments, are designed to accept add-in software modules from third-party vendors.

Quarterdeck Office Systems' Desq does link varied applications, but "you still have to go through the old transfer routines," Dyson noted. "Desq has automated that, but you don't have the underlying commonality."

Another panelist comments

Another session panelist, John Merson of the Computer Factory in New York, noted that Desq "appeals to a subset of our customers" who are experienced users and want to continue running their favorite programs.

Outside the range of machines based on the Intel Corp. 8086 family of chips, Apple Computer, Inc. does offer a standard operating environment for its Macintosh, Dyson commented.

"Software developers must obey the [Macintosh's] conventions," she said. "This is pretty restricting if you think you're a genius, but from the user's point of view, it's terrific."

Personal Mini from Televideo ties IBM micros

By Paul Karszenowski
CW Staff

ATLANTA — Attempting to leapfrog the IBM Personal Computer line, Televideo Systems, Inc. came to the Comdex/Spring '84 show here with the announcement of its Personal Mini, which connects 16 IBM Personal Computers or compatible microcomputers into a multi-user system.

The heart of the Personal Mini is the PM/16, the central processor, which includes an Intel Corp. 80186 microprocessor operating at a speed of 8 Mbit; 256K bytes of random-access memory (RAM), expandable to 512K bytes; Televideo's InfoShare operating system, a 640-byte hard disk drive; 1M-byte, 64-K byte floppy disk drive; a parallel port and a serial port.

PM/16 permits each IBM Personal Computer or compatible micro to function as a distributed data processor; to process individual applications locally; and to share central data files, programs and peripherals. InfoShare reportedly features hierarchical, multiuser file structure, "according to record linking, print spooling and on-line help."

The system runs applications designed for Versions 1.1, 2.0 and 3.1 of IBM's PC-DOS operating system. All single-user applications run on the system, "according to Ben R. Cho, vice-president of marketing for Televideo's systems division. "The few multiuser PC-DOS applications available — for example Ashton-Tate's Multiuser Dbase II — are ideally suited for this system."

"We think there is a two- to three-year window before IBM will announce multiuser capabilities or a network for its microcomputers," Cho said. "We intend to provide us with a solution to the problem of Personal Computers sharing data."

The Personal Mini PM/16 costs \$8,995, while an adapter card that connects any IBM Personal Computer-compatible portable microcomputer: TPC IIS and TPC IID. The company had announced TPC IID at Comdex/Fall '83 last November. Before shipping the product, the company expanded TPC IID's RAM from 128K bytes to 256K bytes and lowered its price from \$2,995 to \$2,595.

The machine features an Intel Corp. 8088 microprocessor, 256K-byte RAM, 640- to 800-pixel resolution, an RS-232C serial port, a parallel printer port, and two single-sided, double-density disk drives with 360K-byte storage.

The TPC IIS is the same machine as the TPC IID, but it has only one disk drive and costs \$2,295. Televideo Systems is located at 1170 Morse Ave., Sunnyvale, Calif. 94086.

COMDEX from page 1

512K bytes of random-access memory (RAM) will cost \$6,995, the company said. Corona is based in Westlake Village, Calif.

Besides announcing the Personal Mini (see story at right), Televideo Systems, Inc. of Sunnyvale, Calif., unveiled the Telecolor PC, a personal computer offered with 256K bytes of RAM and a 12-in. color screen.

A floppy-disk-based Telecolor PC will sell for \$3,295, while a hard disk model will cost \$4,795.

Xerox Corp. announced a Disk Expansion Module for the Xerox 16/8 Professional Computer, which offers

file transfer capabilities between operating systems, including Digital Research, Inc.'s CP/M and CP/M 86 and Microsoft, Inc.'s MS-DOS.

This setup provides functional compatibility with IBM Personal Computers, the Rochester, N.Y., vendor said.

A dual-floppy configuration costs \$1,050, while a setup with one floppy disk drive and a 10M-byte hard disk drive sells for \$3,050.

Another system not boasting full IBM compatibility came from Morrow, Inc., which introduced a 9-in. portable unit built around a Harris Corp. 80C86 CMOS chip. Morrow's Pivot features 128K bytes of RAM

(expandable to 512K bytes) and a 16-line by 80-char. LCD.

The price of the system, which runs MS-DOS, starts below \$2,500.

Among a host of communications offerings launched at Comdex/Spring, Digital Communications Associates, Inc. of Norcross, Ga., broadened its series of micro-to-mainframe products with several additions. One of these, the Irmacom printed-circuit board, is said to allow an IBM Personal Computer to emulate a variety of IBM controllers and terminals.

Irmacom is available in five models; the board and one diskette will sell for \$895.

CORRECTIONS

The MDC-360 and AIC-525 diskette certifiers and the ADC-525 diskette copier listed in the Auxiliary Equipment category of the May 21 Microcomputer section mistakenly said the products were announced by Hesley Corp.

The correct vendor of those products is Certel, Inc., which is located at 40660 Christy St., Fremont, Calif. 94538.

In "Novel recruiting methods targeting DP professionals" (CW, May 14), a comment that should have been attributed to employment recruiter Steve Burns, who is employed by Fox-Morris Personnel Consultants, Inc., was mistakenly attributed to David E. Moran Jr., who works for General Employment Enterprises, Inc.

It was Burns, not Moran, who said he would like to hold a drawing for an automobile, and it was an office in Burns' firm that once held a drawing for an IBM PCjr.

Micro Data Base Systems, Inc.'s Knowledge Manager (CW, April 16) is designed for processors that run IBM's PC-DOS, Microsoft, Inc.'s MS-DOS or Digital Research, Inc.'s CP/M 86 operating systems.

CAN YOU HELP US FIND THIS HEWLETT-PACKARD EQUIPMENT?

We want to buy the following Hewlett-Packard equipment, new or used, and have exhausted known sources:

HP 3480D Digital Voltmeter, preferably with Options 001 and 004.

HP 3484A Multifunction unit, preferably with Options 041, 042, and 043.

HP 5321B-K21 Digital clock.

HP 5327B Timer/Counter/DVM, preferably with Options H31, 004, and 011.

HP 10542A Remote programming interface cable.

If you have any or all of this equipment which we might buy please call: R.A. Arena, (314) 925-5963.

Or write:

R.A. Arena, Dept. 6411, Building 98, McDonnell Douglas Astronautics Company, Box 516, St. Louis, MO 63166

**MCDONNELL
DOUGLAS**

Analysts skeptical about Unix as micro standard



OW AT
COMDEX/Spring '84

By Paul Karasulow
CW Staff

ATLANTA — While some claim Unix has emerged as a standard on supermicrocomputers, its future as an operating system standard for single-user microcomputers is very much in doubt.

That consensus was voiced here last week by industry analysts at a Comdex/Spring '84 seminar called "Unix: A Standard?"

"In the last four years, there have been 70,000 microcomputers with Unix or a Unix derivative sold," noted Mark S. Ursino, president of Issaquah, Wash.-based Technology Services Corp., a computer services and consulting firm. To illustrate Unix's relatively shallow penetration in the micro arena, he noted that "Apple [Computer, Inc.] shipped 70,000 Macintoshes in four months."

Analysts cite reasons

Analysts cited a number of reasons for the slow acceptance of Unix by the microcomputer industry. "There hasn't been a significant Unix system in the retail market," said Ann L. Winblad, executive vice-president at Open Systems, Inc. "IBM's en-

dorsement of [Microsoft, Inc.'s] MS-DOS played the key role in encouraging software developers to write software for MS-DOS."

Moreover, AT&T has prevented software developers from helping Unix emerge as a standard, Ursino claimed. "AT&T refuses to provide adequate tools and support to software developers."

Technical shortcomings were also cited as a hindrance to Unix's acceptance as a microcomputer standard. While AT&T claims that Unix is a universal operating system, applications cannot be moved from one version of Unix to another version, claimed John Little of Moki Solu-

tions, Inc. Little's firm produces the S1 operating system, a Unix competitor.

Little claimed that Unix possesses limited functionality, inadequate networking capabilities, a poorly structured file system, unfriendly user interfaces and minimal security procedures.

Winblad listed a number of developments that may preclude microcomputer market acceptance of Unix. These include a projected growth of the multiuser microcomputer market; the increasing number of programming languages being ported to Unix; use of Unix by next-generation microprocessors, such as Intel Corp.'s

80286; growing acceptance of the C programming language; and the emergence of sophisticated microcomputer users.

"As users look to share data with a network or a multiuser system, they will realize that attaching a dumb terminal to a computer is less expensive than buying network hardware and software," Winblad predicted.

None of the panelists was certain of Unix's future. It could become either the industry's next de facto microcomputer standard, or the most widely publicized, yet seldom used, operating system in history, according to Winblad.



DEC unifies micro efforts



OW AT
COMDEX/Spring '84

ATLANTA — Digital Equipment Corp. has created a Business Computer Group to handle all small-business sales, the company announced at Comdex/Spring '84 here last week.

The new organization combines three existing groups: Commercial OEM, Small Business (the company's business centers) and the retail operation of the Personal Computer Group.

Direct sales of the Personal Computer Group are being handled by DEC's strategic marketing groups.

The Business Computer Group, headed by DEC Vice-President Ward MacKenzie, will be fully formed by July 1, according to the company. It will target businesses with annual sales under \$100 million, according to group marketing manager John O'Keefe, who said the restructuring will not affect sales to major accounts.

DEC began shifting responsibility for direct sales of personal computers from the Personal Computer Group to the strategic marketing groups last year, O'Keefe said. "Historically, that's the way DEC moves once a product line is established," he noted.

Joel Schwartz, vice-president of the Personal Computer Group, will assume a new position within the company in July.

- BDS/Dataproducts Plug-Compatible Printers
- Built for Handling Continuous High-Volume Output

IBM · DEC · BURDOUGHS

- Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
- Over 5,000 Systems Installed
- Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
- 30-50% Savings
- Quick Delivery (30 Days or Less)
- Reliability Built-In (BDS Controllers and Interfaces)
- Low Maintenance Cost
- TRW Nationwide Service
- Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers.

☐ 55 CPS
Daisy Wheel Printer

☐ 80-200 CPS
Matrix Printer

☐ 300-2000 LPM
Band Printers

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____



619 946-2111

BDS Corporation
300 Nevada Ave.
Menlo Park, CA 94025

U.S. (714) 788-0000 Australia (03) 555-0000

NEWS

Senate poised to choose office automation vendor

By John Deacon
CW Staff

WASHINGTON, D.C. — The Senate Committee on Rules and Administration has narrowed from 38 to six the number of companies being considered to bring offices of the elite 100-member body into the information age.

A final decision on awarding the office automation contract to one or more vendors is likely next week, according to Patrick Sarman, a staff member of the Senate Committee on Rules and Administration.

The main applications of the automated systems will be word processing, scheduling for the senators and

'It's taken a while to get these older people — I'm one of them — to use these things. The time has come.' — Patrick Sarman, staff member, Senate Committee on Rules and Administration

their staffs, spreadsheets for office budgeting and electronic mail. "We are currently not automated in any way," Sarman said. "We are going to burn our quills."

He added, "In effect, we have 100 bosses here; everyone does everything their own way."

The most automated machines in Senate offices now are correcting

IBM Selectric typewriters and a few memory typewriters; 95% of the paperwork in each office is processed by hand.

The decision was made to go with an integrated system featuring mini-computers in each office, rather than a nonintegrated, microcomputer-based system, Sarman said. Each office will have access to legislative

data bases from the Senate Computer Center and the Library of Congress; such access is now available from central terminals.

The six vendors who were asked to perform last demonstrations are M/A-COM Sigma Data, Inc. of Rockville, Md., and Inslaw, Inc. of Washington, D.C., both systems integrators; and Data General Corp., Prime Computer, Inc., Honeywell, Inc. and Digital Equipment Corp.

In a meeting last week, the Rules and Administration Committee requested information on the lifetime costs of the proposed systems, whose costs have been estimated to range from \$23 million to \$35 million over a three-year span, according to Ron Hastings of Prime.

Whether multiple vendors or a single vendor should provide automation for the Senate is also an issue. While some argue that a single system would be easier to maintain, Sarman is for multiple vendors. "With a single contract, the vendor has no incentive to give excellent service," he explained. "With multiple vendors, you have incentive."

Though a correspondence tracking system is not being requested in the automation proposals, eight senators from large states have asked that a tracking system be provided with the new automation system.

Laurence Klaben of Inslaw said his company now offers such a service to 20 House members on a time-shared basis.

"We're the only one of the six companies that brings this kind of experience to the Senate proposal," Klaben said. However, two companies have pilot automation systems at work in the Senate. Honeywell now provides pilot automation in the offices of Sen. Edward Kennedy of Massachusetts and Sen. Robert Dole of Kansas, who is a member of the Rules and Administration committee.

DDC is providing pilot automation in the offices of Sen. Gordon Humphrey of New Hampshire, Sen. Bill Bradley of New Jersey and Sen. James McClure of Idaho, also a member of the committee.

Sarman said results of the automation tests were encouraging. "Productivity increased dramatically, especially when it came to speechwriting," he said, noting that speeches often must be typed over over to incorporate changes, a frustrating task to perform manually.

Asked why it has taken the Senate until now to seek office automation methods, Sarman said, "It's taken a while to get these older people — I'm one of them — to use these things. The time has come. It's here and now."

While the Senate office automation contract would be a prestigious one to win, there is a hitch: the request for proposals states that a company cannot refer to the Senate in advertising.

However, Robert Magne of DG said the contract has "strategic importance."

Other members of the 12-member committee include Sen. Howard Baker of Tennessee, Sen. Robert Byrd of West Virginia, Sen. Jesse Helms of North Carolina, Sen. Clairborne Pell of Rhode Island and Sen. Daniel Inouye of Hawaii.

GIVE PERSONAL COMPUTERS THE SNA OR BSC NETWORK RECOGNITION THEY DESERVE.

Now there's a software and hardware package by Pathway Design that features a multi-tasking modular architecture allowing personal computers to be intelligent and effective in SNA or BSC networking environments.

Get 3270/3770 Functionality Without Expensive Protocol Converters or Controllers. Our software products and communications adapters enable your PC to transparently emulate 3270 Information Display System devices or 3770 remote job entry stations. And, they include many value-added communications features for unsurpassed versatility.

The Communications Adapter You Only Have To Plug In Once. Access a wide variety of communications networks without ever changing the board. When you plug our board into an available PC expansion slot it acts as a subminiature circuit board supporting SNA/SDLC, BSC, RDC, and asynchronous protocols.

Discover Enhanced File Transfer Capability.

With our 3770 you can transfer a variety of files to many different locations in remote

data receiving formats. You can upload or download information to your screen or to a disk. And, the 3770 offers newly-enhanced file transfer capabilities including the transfer of executable images and ASCII text files plus standard data files and JCL commands.

Best-In-Class And Local Multiple Concurrent Printer Support.

Pathway Design products give you the ability to configure multiple printers and perform host-initiated and local print functions concurrently and independently.

Pathway Design's Three Part Architecture. The Most Powerful PC-Mainframe Link Ever For SNA and BSC Networks.

By combining communications services with presentation services and device drivers, Pathway Design provides the user with an unparalleled array of capabilities for both current products, and for easy enhancements in the future.

PATHWAY

Pathway Design, Inc.
171 Western Blvd., Suite 200, Westborough, MA 01581
(617) 353-4955

No One Can Emulate Pathway Design Products, User Support And Price.

Pathway Design products come with a lifetime software warranty and are supported by our 800 HOTLINE NUMBER. Complete easy-to-use documentation is always provided. And, the best thing about Pathway Design products is the price.

Send the coupon below for further information on Pathway Design products, now in use in hundreds of locations. Or, for a faster reply, call 800-343-9515 (617-353-7722 in Massachusetts). Since you'll see why no one can emulate Pathway Design products.

Find Out How You Can Give Your Personal Computer The Mainframe Network Recognition It Deserves. Fill in and send this coupon for information on Pathway Design mainframe personal computer communications links. **OR FAX**

Name
This
Company
Address
City State Zip



NEWS

Carriers blitz Charleston in battle for customers

By Bryan Wilkins
CW Washington Bureau

CHARLESTON, W. Va. — Residents of this state capital are being treated to a wild and wonderful media blitz by eight long-distance telephone carriers. The eight are waging an all-out battle to sign up 24,000 business and residential telephone customers by July 15.

That is the effective date in Charleston of equal telephone access — the day on which Chesapeake and Potomac Telephone Co. of West Virginia, a divested Bell operating company, ends its dependence on AT&T and moves to a system that offers multiple carriers "equal access" to the exchange's telephone subscribers. The Charleston media blitz is likely to be repeated in 39 other major cities across the U.S. this year. As a result of the recent divestiture of AT&T, each telephone subscriber will have to pick the long-distance carrier he plans to use when equal-access facilities are in place. Chesapeake and Potomac will program its central office switch to reflect the first choice of the subscriber, who merely will have to dial "1," an area code and a phone number to place a long-distance call.

However, if the customer wants to use a second long-distance carrier, a dialing sequence that is five digits longer will be required. Consequently, the carriers see a distinct advantage to being designated a subscriber's primary carrier.

Here in Charleston, the competition has reached fever pitch. Carriers' radio, television and newspaper advertisements are providing a sudden windfall for local media owners, and telephone sales personnel have been hired by the droves.

Eight competing carriers

The eight carriers waging the battle for Charleston's local telephone subscribers — AT&T Communications; Satelec; Call U.S., Inc.; MCI Communications Corp.; Telamarketing Communications, Inc.; Satellite Business Systems, Inc.'s Skyline; GTE Corp.'s Sprint; and Long-Distance Telephone Savers, Inc. — are implementing new marketing strategies weekly.

In a surprise move earlier this month, MCI, the second largest carrier in the U.S. after AT&T, announced that on July 15 it will eliminate its initial and monthly subscription fee for all of its current customers nationwide in order to match similar moves by GTE Sprint.

AT&T recently announced it will give customers who sign with it 60 minutes of free long-distance calling. The move was promptly matched by MCI.

MCI adds 2,000 subscribers

"Charleston has become the New Hampshire primary of the telephone business," said MCI Chairman Bill McGowan. Since the advent of the campaign, MCI said, it has increased from 1,000 to 3,000 the number of subscribers that have designated MCI as their primary carrier.

According to the legal requirements for the switch to equal access, each divested Bell operating company will have to install at least one equal-access facility by September 1984. By September

1985, at least one-third of the access lines through the local telephone companies will have to be capable of offering equal access to carriers and customers. By September 1986, all exchanges in the U.S. will have to be switched to equal access.

Once the telephone consumer designates which long-distance carrier is his primary carrier, he will be able to change to another carrier, but only upon payment of a fee.

In Charleston, Bell Atlantic, the regional holding company, will permit its customers to change carriers free of charge once during a nine-month period after the customers have been notified that equal access is available. After that nine-month period, however, it will cost \$26.99 to designate a different primary carrier.

In Washington, D.C., where equal access will be available in parts of the city next September, the fee for changing carriers will be \$41.00. In New Jersey, another Bell Atlantic service area, the changing fee is the lowest — \$20.

The major work required by the seven regional holding companies to implement equal access is being done by their research arm, Bell Communications Research (BCR). Technically, equal-access requirements include comparable dialing sequences, equal access on rotary or push-button systems, transmission characteristics of equal quality, single dial-tone access and the automatic provision of answer supervision and billing information.

Future carriers the biggest problem

Robert Mercer, BCR assistant vice-president for network comparability planning, said the biggest difficulty with equal access was to "develop a scheme that allowed equal access to all companies that might get into the interexchange (long-distance) business."

This was solved by offering each carrier an access-code number, 10XXX, in which each X can be any number between 0 and 9. The XXX sequence will identify a particular carrier and eliminate the need to dial long strings of numbers to reach that carrier, Mercer said.

BCR systems engineers have developed software programs for the local telephone companies' central offices to recognize the particular carrier access codes, judge their validity and then route a call to the proper destination.

Another technical problem presented to BCR engineers involved the recognition of rotary telephone "clicks" is a digital format, which required a different set of software programs at the local switch to convert the signal to an appropriate form for routing.

Routing calls

Routing calls from different long-distance carriers required further software programming at the central office, where a call will now be routed directly to an interexchange switch, bypassing other

local switch handoffs. The central offices will also have software supervision programs to ensure the completion of a call connection before billing occurs.

While the technical changes being made by Bell Atlantic add up to significant costs, the carriers themselves are spending like campaign candidates at election time.

MCI confirmed that it plans to spend at least \$400,000 here on its local campaign, which emphasizes that MCI's long-distance rates are 60% lower than its major rival, AT&T Communications, which has an estimated 92% share of the long-distance market nationwide.

AT&T emphasizes tradition

AT&T Communications' campaign, using the faces of actors and TV personalities, emphasizes its long tradition of providing reliable service and such features as operator intercept and assistance, which the other carriers do not offer.

Large businesses with extensive communications requirements, ranging from massive data communications to multiple-voice calling, are the customers that the long-distance carriers are spending lots of time wooing.

However, large businesses have realized the need in recent years to employ experts familiar with long-distance tariffs and rates in order to keep their costs down. For example, Blue Cross/Blue Shield of West Virginia hired an outside consulting firm, Tele-Mark, Inc., to tell it what to do.

No new problems for business voice systems

Al Niderstrof, president of Tele-Mark in Port Hill, Pa., said that adapting users' existing business voice systems for the new equal-access facilities of the local telephone company does not present new problems.

"Where the user already has in place an MCI or a Sprint capability, the dial '1' access will just make things easier," Niderstrof said. "Otherwise, it will just depend on the type of [private branch exchange] switch the organization already has in place."

Niderstrof said that MCI's sales effort in Charleston "is having a heck of an impact," making people more aware that competition to AT&T exists. In the past, people were reluctant to switch to a competitive carrier because of the need to dial more digits, he said. Now, that will not be necessary, and the subscriber can take advantage of lower rates.

Most businesses already have in place facilities for multiple-carrier options and specialized lines such as foreign exchange and private line. In addition to Wats, Niderstrof predicted that business use of these services will increase as the dial "1" access capability spreads across the country and as businesses need to control increasing long-distance calls from their offices.

In the future, Niderstrof said, long-distance planning for business will depend on flexibility, such as that gained by making software changes, to reflect changing regulatory and tariff realities. "It's easier with the switches driven by software... The user doesn't have to worry about what to do," he added.



The growth in local

'Charleston has become the New Hampshire primary of the telephone business'

MCI Communications Corp.
Chairman Bill McGowan.

Ford to purchase 70% interest in Starnet transmission service

DEARBORN, Mich. — Ford Motor Co. last week announced it will purchase a 70% interest in Starnet Corp., a three-year-old, San Diego-based long-distance telephone and data transmission service.

Presently, 80% of Starnet is owned by Greater Media, Inc., and 19% is owned by United Brands Co. Both re-

portedly will continue to hold equity interests in the company following Ford's purchase.

Ford said it will operate the company as a subsidiary of Ford Aerospace and Communications Corp. Starnet provides long-distance telephone service and data transmission, primarily using satellites, for 1,500

businesses nationwide.

Philip Caldwell, Ford chairman, said the company expects the long-distance telecommunications market to continue to expand rapidly. "The high-quality telecommunications services that Starnet provides to its clients, at attractive prices, will broaden Ford Aerospace's growing

business base," Caldwell said.

The investment is another step in Ford's plan to diversify, he added.

Another of the Big Three automakers, General Motors Corp., was reported last week to be involved in discussions with Electronic Data Systems Corp. of Dallas about an acquisition or business association.

NEWS

Tips offered on tying external data bases to info center

By Edward Weiser
CW Staff

BOSTON — MIS managers who want to link their information centers with a dial-up data base should find a means to catalog the information in that data base for their users. And they should pay special attention to the means of communications used to download data to the external data base from their internal workstations.

Those observations, made by Samuel H. Solomon, vice-president for sales and marketing of Corporate Management Systems, Inc., were among several provided by industry representatives attending the mid-year management conference of the Information Industry Association here.

Solomon, whose credits include configuring the front-end computer support system for the investment banking firm now called Shearson Lehman/American Express, Inc., predicted a future in which dial-up data base information will be downloaded not to a corporate mainframe, but to the disk servers of a firm's local-area network, from which it can be accessed by the local-area network's workstations. In that way, he said, MIS managers will be freed from having to download the data continually

from the mainframe to workstations themselves, and only those workstations that actually need the data will have access to it.

That may be very soon in coming, Solomon said, who added, "If I were an MIS manager, I would not want to spend my day downloading 2M to 3M bytes of [network data base] info to users."

Rapid change a problem

Other data base vendors at the conference said an additional problem confronting MIS managers considering an outside data base is that the data base industry is changing too rapidly and that standards, particularly in spreadsheet software and the use of microcomputers, have still not been set. Larry Day, senior vice-president of electronic publishing and industrial research at Business International Corp., said data base products are changing every week, and "I see nothing but absolute chaos for the next five years."

Solomon agreed and urged that the information industry — made up of data base publishers, on-line newsletters and videotex vendors — step back from following the quick-changing fashions of the marketplace and "let some opportunities pass." But another member of the roundtable

panel at which Solomon and Day spoke warned that failure to follow market changes might mean "you just won't be here in five years."

Looking again to the future, Solomon predicted that MIS departments will integrate their firms' data with that coming into corporate information centers from outside data bases. Powerful economic calculations would then be possible, he said, adding that such thoughts are currently "real space-age" because of the internal politics that limit corporate departments from sharing data with each other.

An appropriate first step in this direction, he said, would be for a firm to index in its data dictionary the information to which it has access in outside data bases. Later, the data dictionary could be expanded to include in-house data sources as well, he said.

One firm that already has taken an information center approach to both its in-house and outside data bases is the Alabama conglomerate Blount, Inc., according to Peter Robinson, its vice-president for planning. Robinson established the firm's in-house information clearinghouse, where all executives have access to uncensored data on the company and each of its divisions, as well as the data that

the firm gains via its outside data base providers, such as Dun and Bradstreet Corp.

The Blount information center, where most data resources can be accessed on-line, has since been expanded to include a Strategic Intelligence System, which offers day-to-day information on each of the firm's divisions. The information center's services are provided free to the company's managers.

Another executive who spoke at the conference, Donald McLagan, executive vice-president for client operations of Data Resources, Inc., noted that the personal computer arrived on the information industry scene just as time-sharing computer services were entering a down-sliding period, which he called their "creative destruction." Time-sharing, he said, had revolutionized data processing by providing interactive capability for users, and the arrival of the personal computer has continued that situation but disconnected the user from a time-sharing mainframe. The effort, he said, has been to end the heyday of the "information guru" or strategic planner in the corporate information center and to put data base information directly in the hands of the manager at his workstation.

Data base providers told anti-hacking laws key to system security

By Edward Weiser
CW Staff

BOSTON — The boom in personal computers — expected to number 10 million in the U.S. by 1985 — promises to "increase exponentially" the risk of damage to computer systems by hackers unless laws are enacted against them.

So said George Minot, CompuServe, Inc. vice-president, who spoke

to a gathering of executives at the Information Industry Association's mid-year meeting here last week. Minot warned the executives, who represent data base providers and videotex vendors, that "unless this problem is addressed early on, this [information industry] will never reach its potential."

Hackers not only "often steal data base services, but also tie up a sys-

tem's limited number of ports, preventing bona fide customers from gaining access, Minot noted. Those customers may become disgruntled and abandon use of the data base, he warned.

Minot, who admitted that in one case hackers stole \$1 million in CompuServe services in two days, called upon the information industry to establish greater system security, lob-

by for the passage of anti-hacker laws and promote greater public awareness of hacking as a crime.

He said he would be sure officials should be consulted before rather than after an intrusion occurs, and that information service providers should post a "no trespassing notice" on the screens their systems display to users. Such a notice will give prosecutors the basis on which to prosecute a hacker, at least on trespass charges, he said.

Minot later turned the rostrum over to Jonathan M. Winer of the Massachusetts Lt. Gov.'s staff, who said that sometimes even a trespassing charge is not enough to bring a conviction against a hacker. "How can you trespass if you don't even know the state?" Winer asked.

Stopping a hacker

Winer, the author of an anti-hacker bill now under consideration by the Massachusetts legislature, said the key to stopping the hacker is a law that bans both intentional access to a computer system by an unauthorized user and the larceny or damage to data that often arises.

The Massachusetts' anti-hacker bill does both, providing misdemeanors or penalties of one year in jail and up to a \$60,000 fine for intentional intrusions and felony status for data larcenies.

Minot said the anti-hacker bill is unlikely to pass this year, but will in 1985. He claimed that a roadblock to its passage is the information service industry itself, which he said fears speaking out about specific intrusions that have occurred on their systems. "I've been told of crimes in many parts of this state by [firms] who will not go public with it."

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274

Datalynx™/3274

remote async ASCII

protocol converter sup-

ports SNA/SDLC or

ASC protocols. 80 types of ASCII async terminals can

emulate IBM 3278 display stations. RS-232C ASCII

async printers can emulate IBM 328X printers.

DATALYNX™/3780

Datalynx™/3780 async ASCII-to-IBM 3780,

2780, 2770 and 3741 protocol converter supports

EBCDIC BSC protocol on one channel and async

ASCII devices on the other two channels. Features

include transparency, mini/micro support and free

file transfer program.

INTERLYNX™/3278

InterLynx™/3278 allows the attachment of

low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278

For micro-mainframe

file transfers.

INTERLYNX™/3187

InterLynx™/3187 allows attachment of ASCII

printers to IBM Type "A" coax ports or 3274/3276/

4701 controller and 4321/4331 CPU's.

SNA LU1/SCS and LU3 capability are standard

and serial ports and front panel set-up.

For more information call today.

Local Data @ 2781 Toledo Street @ Suite 700 @

Boston @ MA 02118

Telephone (617) 330-7135

Telex 912033

Cable 0613 737-0941

Local Data

Now Lynx to IBM.

low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278

For micro-mainframe

file transfers.

INTERLYNX™/3187

InterLynx™/3187 allows attachment of ASCII

printers to IBM Type "A" coax ports or 3274/3276/

4701 controller and 4321/4331 CPU's.

SNA LU1/SCS and LU3 capability are standard

and serial ports and front panel set-up.

For more information call today.

Local Data @ 2781 Toledo Street @ Suite 700 @

Boston @ MA 02118

Telephone (617) 330-7135

Telex 912033

Cable 0613 737-0941

Local Data

Now Lynx to IBM.

NEWS

Anheuser-Busch says no to micros, yes to info center



CW AT PULSE

By Paul Gilks
CW Staff

ORLANDO, Fla. — It is virtually impossible for employees to buy a microcomputer at Anheuser-Busch Companies, Inc. in St. Louis. The situation exists by choice.

"Anheuser-Busch tends to be a conservative company, and they're waiting for the technology to become more advanced," explained Rose Wietop, systems analyst in the information center at Anheuser-Busch. "They're also waiting for a time when the [personal computer] will be able to kick back to the mainframe for a file or more memory without the user having to know sign-on procedures."

Speaking here last week at the eighth annual conference of Focus Users for System Enhancements (FUSE), the user group of Information Builders, Inc.'s Focus fourth-generation language and data base manage-

ment system, Wietop said that despite its strict micro policy, Anheuser-Busch has succeeded in largely satisfying end-user computing needs through a large information center. The center consists of IBM 3083N and 370/154MF mainframes running IBM's VM/CMS operating system on top of MVS and OS/VS1.

A variety of user-oriented software packages run on these processors. Among them are Focus; Comshare, Inc.'s System W; Iacon, Inc.'s Tell-a-Graf; SAS Institute, Inc.'s SAS Graph; and The Mega Group, Inc.'s Megacalc mainframe spreadsheet.

The information center processors also serve as a backup to the corporate data center in case of a disaster. Extracted data is regularly loaded into the information center for end-user access.

The center was installed principally to offer an alternative to micros and to challenge the growth rate of external time-sharing costs. Wietop says. Since it was set up in 1983, the user base has grown from 120 to 670. Its use in 1983 led to the first reduction in time-sharing costs, revers-

ing a trend that had seen costs escalating at 33% per year.

Among the services provided for users by the information center staff are hot-line assistance, extensive training, consulting advice on the use of tools and methods, maintenance and support of software, data transfer between the two data centers, ordering and distribution of manuals and evaluation of software requests.

A staff of four supports the 670 users. Operations support is not provided, but is available as needed through the corporate data center.

Strict charge-back rules

The information center employs strict charge-back rules for CPU usage and programming assistance, although training and maintenance are provided free of charge. Still, Wietop said, the information center rates are about 30% to 50% of the rates for time-sharing.

Focus has been a keystone to the use of the information center, she said. The concept took off immediately after Focus training was introduced in October 1982 and slowed when training was cut back earlier this year.

To use Focus, users must develop a good background in basic mainframe tools. They must first have an application in mind that needs to be developed. They must also take introductory classes in data processing, learn how to use the IBM 3270 terminal

and be well versed in IBM's ISPF editor. In fact, users must turn in an ISPF assignment before they can start the Focus class, she said.

Anheuser-Busch has developed its own training course, but emphasizes that to be effective, users must employ the tools regularly. With Focus, for example, users are expected to practice on the system for at least 30 hours within two weeks after the training class.

Like many companies, Anheuser-Busch has not seen a reduction in its application backlog since the information center was established. However, the content of the backlog has changed, Wietop said. Applications that were not deemed important enough to be placed on the waiting list in the past are now being written by users. As a result, the data processing staff is free to work on larger and more complex applications.

However, programmers do not usually take easily to the concept. "They believe you're trying to get rid of them," she said. To avoid problem, Wietop recommended explaining that the purpose of the information center is to change their work to higher quality rather than high-quantity development.

"We have trained the entire application department in Focus, so if the user doesn't want to do a report, he can have it done there," she said. "This helps relieve the 'us vs. them' syndrome which we had at first."

Information Builders unveils upgraded version of Focus



CW AT PULSE

By Paul Gilks
CW Staff

ORLANDO, Fla. — At the eighth annual meeting of the Independent Focus Users for System Enhancements (FUSE) organization here last week, Information Builders, Inc. announced an enhanced version of its Focus high-level language and data base management system. Focus Release 4.5 includes data base enhancements, improvements to the Fides screen manager, language enhancements and new external interfaces.

A new Combine command allows automatic updating of up to 16 separate Focus files within a single procedure, a spokesman said. Schema enhancements allow Defined expressions to be stored in Focus Master File Descriptions and accessed whenever the file is used.

Users can now designate whether missing data values are to be identified or defaulted. In addition, Modify procedures that include many IBM 3270 screens can now be compiled and saved for later execution. Binary indexing is now supported, offering greater efficiency for large data bases, the company claimed.

Enhancements to Focus's Fides screen manager include support for 3270 screen attributes; dynamic attribute change on 3270 terminals; automatic forms creation, which is a facility for novice users that generates fully formatted Fides screens listing all data base fields; and Auto-mod, a menu-driven procedure that provides automatic application generation for relational Focus files.

Among the language enhance-

ments is a facility to include master file descriptions of fixed-format sequential files in Perform Modify procedures. This eliminates the need to list each field and its individuality and allows users to create subset Hold files with select field names for automatic loading into Modify procedures, the spokesman said.

Relational join facilities have been expanded to include full-scale joins of IBM IMS, Vsam, Isam and Quam files to single-segment Focus files. Up to 16 data bases can be simultaneously joined together at report time, the spokesman said. Dynamic field formatting has been added, allowing the formats of data fields to be specified dynamically in Table requests.

New interfaces are now available for Software Arts, Inc.'s DIP (data interchange format), IBM's DL/I data bases under the DOS operating system and Execucom Corp.'s IFPS decision support system. The DIP interface allows users to extract data from IBM's IMS, Collinet Software, Inc.'s IDMS, Software AG of North America, Inc.'s Adabas and Isam, Vsam and Quam files and download it into microcomputer-based packages using the DIP format.

The DOS/DL/I interface is for users of IBM's CMS operating environment and is part of Information Builders' Cross-Machine Interface (XMI). The XMI interface allows Focus users under CMS to query DOS/DL/I data bases allocated on other virtual or physical machines and to use those data bases in Focus relational join operations.

The IFPS interface lets IFPS users access data from Focus or non-Focus files and create new files in IFPS.

A complete Focus basic system is priced at \$66,000 and is available from Information Builders at 1250 Broadway, New York, N.Y. 10001.

HARNESSING THE POWER OF COBOL. DATA-XPERT™

DATA-XPERT uses your COBOL layouts to provide complete data manipulation capabilities without programming.

By harnessing the effort already invested in your COBOL layouts, DATA-XPERT eliminates the need to learn new languages and reduce the time.

The example shows how DATA-XPERT provides unlimited updating flexibility by dynamically superimposing your COBOL layouts over the data. These formatted displays include total field validation based on the COBOL picture clause.

HARNESS THE POWER OF YOUR COBOL LAYOUTS
Call or write today to learn more about DATA-XPERT's extensive capabilities.

XA SYSTEMS
CORPORATION

3000 Scott Blvd., Ste. 216
Santa Clara, CA 95050
908-556-8187 ext. 972
908-573-3476 ext. 972 in CA

NEWS

Attendance at Fuse meeting double that of last year

Organizational changes appear effective in encouraging participation



CW AT FUSE

By Paul Miller
CW Staff

ORLANDO, Fla. — Even conference organizers had to admit they were surprised at the turnout last week for the eighth annual meeting of Focus Users for System Enhancements (Fuse), the users group of Information Builders, Inc.'s Focus fourth-generation language. The attendance of just under 1,000 was nearly double that of last year's meeting.

And while the balmy Florida weather and the conference's proximity to several tourist attractions undoubtedly played a part, recent changes at Fuse have been effective in encouraging participation, organizers said.

For one thing, Fuse this year eliminated the nominal membership fee it had previously charged. While the membership fee was only \$100 per company, "it was unbelievably hard to get that money out of some companies," said Bill Sklar, a vice-president at Irving Trust Co. in New York and president of Fuse. "We felt that by raising the attendance fee a little, we could more than cover the lost revenues."

Fees for this year's conference came to \$500 for vendors and nonmembers and \$425 for members. Fuse expects to have about \$50,000 left over after expenses. All of the proceeds will be plowed back into Fuse activities.

In 1983 the group took the step of incorporating and receiving tax-exempt status from the Internal Revenue Service. It also hired an employee to handle logistical work. These moves have allowed the group to establish itself more clearly as an independent entity and to foster more cooperation among the 16 regional users groups, Sklar explained.

In addition to hosting the annual conference, Fuse publishes a newsletter and sponsors a technical coordination committee. The committee monitors Information Builders products, coordinates membership surveys and suggests enhancements.

The function of a users group should be "to form a single voice to let a company know what user concerns are," Sklar said. "A Fuse recommendation coming from thousands of ballots is not something [Information Builders] is going to take lightly." The voice is apparently being heard. As Information Builders spokeswom-

an said that, as a result of Fuse complaints about inadequate Focus documentation, the vendor added three full-time documentation writers in the last year.

In fact, Sklar said Fuse has had a major impact on the overall quality of Focus

code. "While [Information Builders President] Gerry Cohen had been pushing new features in the past, we concentrated very much on the integrity of Focus code," he said. "As a result, Focus is a much more stable product than it used to be."

Although it is independent, Fuse cannot free itself from some reliance on Information Builders. The host company publicizes Fuse activities through its marketing literature and lends support for administration of the annual meetings. Infor-

mation Builders also hosts a cocktail party at each conference.

In exchange, it gets 10 free registrations. However, Information Builders this year paid the full registration price for the additional 60 representatives it sent.



This one sloppy floppy can

THE SLOPPY FLOPPY

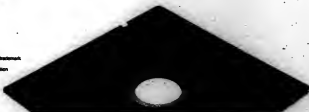
Most companies seal their discs with a spot here, a spot there. Leaving most of each seam not sealed at all.

Sooner or later, the seams might do what comes naturally: they bulge. Warp. Pucker. Open up.

You can prove it to yourself. Just take a floppy and twist it.

See those wide open spaces? That's sloppy. And dangerous. Because if you put a sloppy floppy into your disc drive, it can jam the drive. Lose your data. Or ruin the drive head. And there goes \$400.

Memorex is a registered trademark of Memorex Corporation
©1984 Memorex Corporation
A Burroughs Company



NEWS

Job worries seen stifling fourth-generation language use



OW AT FOCUS

By Paul Gilman
OW Staff

ORLANDO, Fla. — Fourth-generation languages could be used far more extensively

by professional programmers, but misperceptions and worries about job security are holding them back.

That was the consensus among users interviewed here last week at the eighth annual meeting of Focus Users for System Enhancements (FUSE), the independent users' group of

Information Builders, Inc.'s Focus fourth-generation language and data base management system.

Users unanimously reported that Focus and other productivity tools are undervalued by professional programmers, despite the users' assertions that prudent use of the technology could re-

duce development times by 50% or more. In addition, they said, those programmers who do use productivity tools tend to be more visible and more popular with the end-user community.

But old habits die hard. "When someone has worked in a traditional language for many years, it's hard to get

him into something new," said Steven Gilman, a consultant in business user services at Hughes Aircraft Co. in Long Beach, Calif.

Added Warren Smith, vice-president of the BT Share group at Bankers Trust Co. in New York, "It's culture shock. Programmers think it's so easy to use that it's got to be for other people. People think real programmers have to develop in Cobol or assembler."

However, the users reported that use of productivity tools is generally on the rise among programmers at their companies. About 15% of the programmers at Hughes Aircraft are regular users of Focus, "and that seems to be accelerating," Gilman said. Smith said he is pleased that about 30% of the Bankers Trust programming staff now uses Focus.

The learning curve seems to be a major barrier in many companies, particularly among older programmers who are not accustomed to nonprocedural languages. "Programmers want to program in Focus just like they do in Cobol," said Stephen Morgan, a senior systems analyst at Gulf Canada Ltd. in Calgary, Alberta. "The structures just aren't the same. If you try to use IF-THEN statements in Focus, you're going to run into trouble."

As a result, programmers tend to run into Focus bugs more often, Morgan said, and the Focus documentation "is the worst part of the product." When programmers cannot find easy answers to their questions, they tend to give up, he said.

Users also admitted that some responsibility for programmer reluctance lies with the productivity tools themselves. The fact that software like Focus is more resource-consuming files in the face of the efficiency concerns that have always preoccupied professional programmers.

Gilman said, "Transaction-oriented systems are concerned about things like backup and data integrity, and these aren't always addressed in a fourth-generation language."

Many companies have also failed to realize that working with end users has become a more essential part of data processing. "In the past, a programmer's job was 70% DP and 30% business knowledge," said James Hoffman, systems project director in the petroleum products group at Phillips Petroleum Co. "I think those figures have now been switched."

Hoffman's staff of eight includes two Focus programmers and six maintenance programmers working pri-

See W00025 page 16

ruin your \$400 disc drive.

THE MEMOREX® SOLID-SEAM BONDED FLOPPY

Memorex seals its floppy discs with a process it developed, called Solid-Seam Bonding. Solid-Seam Bonding seals shut every inch of every seam of every Memorex floppy disc. Tight as a drum. That makes the Memorex floppy stiffer. Stronger. And your data safer.

You can prove it yourself. Just take a Memorex floppy and twist it. You'll see no wide open spaces.

No wide open spaces that can jam your drive. Lose your data. Or ruin your drive head.

Which could cost you \$400.

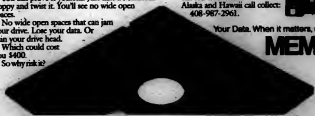
So why risk it?

Protect your drive. And your data. Ask for Memorex floppy discs, with Solid-Seam Bonding.

It's always better to be safe than sloppy. For more information on the full line of Memorex quality computer media products, including computer tape, call toll-free: 800-223-1150. In Alaska and Hawaii call collect: 408-987-2961.

Your Data. When it matters, make it Memorex.®

MEMOREX



NEWS

U.S. must see responsibility to Third World: IBI chief

By John Winkler
CW Washington Bureau

WASHINGTON, D.C. — U.S. government and corporate officials must recognize they have a moral responsibility for a self-interest in the technological development of the Third World, the director general of the Intergovernmental Bureau for Informatics (IBI) said recently.

Prof. F. A. Bernasconi said failure of developing nations to keep pace with trends in information systems and services will mean economic disaster for the Third World, leading to political radicalization and lost markets for advanced nations. Bernasconi was interviewed by *Computer-*

world when he was here recently to hold talks with U.S. State Department officials.

The Rome-based IBI, whose members are primarily Third World countries, but also include France, Spain, Italy and may soon include the U.K., is dedicated to promoting their access to and ability to use informatics, a term used broadly outside the U.S. to denote the entire range of systems and services related to information.

"Informatics has a lot of social, cultural, economic and political implications," Bernasconi said, explaining "it is not limited to information technology because every new development in informatics becomes a tool

in another discipline," such as medicine, agriculture and government.

Informatics "is going to be the most important thing in our near future in the relationship between countries," Bernasconi said.

"Nobody has started to really seriously think about what is happening" in these technological relationships, according to Bernasconi. "It is in the self-interest of the developed countries to anticipate the problems that are coming and to find ways to promote the development of [Third World] countries," he said, noting the Third World financial crisis is causing those nations to fall further behind the developed world in the ability

to use computer and telecommunications technologies.

He predicted that "in the next five to 10 years, there will be a critical situation in the developing world." As an example of the kind of problem arising, Bernasconi pointed to a trend of U.S. manufacturers that have stopped building plants in Third World countries.

With robotics, he said, "you don't need any more cheap labor, and it is more convenient to bring back your factory." He added that at the same time robotics drives down manufacturing costs, it will also cut the cost of raw materials, which are a staple of Third World economies.

This will add another serious blow to those countries and their work forces, which have begun anticipating better financial health because of technological development, according to Bernasconi.

"At the moment in which developing countries become poorer... you will find the radicalization of the rest of the world, and it will be against the interests of the U.S.," he asserted.

"It is a subject that someone has to think about and discuss," he continued. "I haven't the answer to the problem, but the question has to be considered. It is difficult, but it is more dangerous to just let things happen, and there is an ethical responsibility to make an effort to find out what to do."

"The U.S. is a big, powerful, advanced country, but it has... a big responsibility in the Third World in the same way a father has a responsibility for the whole clan."

He said the U.S. government and several major American companies, such as IBM, Control Data Corp. and Sperry Corp., have begun to show an interest in the activities of the IBI. But, he said, "it has started very, very slowly." He added the Soviet Union is at this point more active in the organization. However, neither country is a member of the IBI.

"It is fine to live in a nice country... but you also have to anticipate the problems that will result... if things do not develop in some harmony in the world," Bernasconi said, arguing that the U.S. needs new markets just as much as developing nations need technology.



Reactive or resourceful?

Action rather than reaction marks the resourceful and successful manager. As an MIS/DP specialist, you can anticipate the needs of your colleagues and set in your company's best interests by introducing Dow Jones News/Retrieval into your corporation.

Dow Jones News/Retrieval can be accessed with most standard time-sharing terminals, personal computers or word processors with communications capability... or even integrated into your office automation systems.

It's one way to be certain any manager and staff member, in any department, can have the reliable business and financial news, corporate analyses and economic forecasts needed to anticipate and respond quickly to opportunities for growth and profits.

Dow Jones News/Retrieval is a powerful, versatile, time-saving and, above all, extremely easy-to-use information resource that has application at every level of corporate activity. It will give your entire management team an immediately accessible selection of high-quality data bases they can use to solve problems, analyze trends and increase productivity.

Only Dow Jones News/Retrieval provides instant electronic access to *The Wall Street Journal*, *Barron's*, the Dow Jones News Service and Dow Jones Current and Historical Quotes that are continuously monitored for accuracy by our staff.

Dow Jones News/Retrieval can even accommodate departmental usage billing if you wish. Users may also purchase Spreadsheet Link, the Dow Jones Software package that allows you to download data from Dow Jones News/Retrieval into three of the leading spreadsheets: Visicalc®, Lotus 1-2-3® and Multiplan®.

For every action there's a reaction. Call Dow Jones News/Retrieval right now and watch your colleagues applaud a very smart decision. For full details, call Eric Bradshaw, National Sales Manager, during office hours at (609) 452-2000, Ext. 3678.

DOW JONES
NEWS/RETRIEVAL

Copyright © 1984 Dow Jones and Company Inc. All Rights Reserved. Dow Jones News/Retrieval is a registered trademark of Dow Jones and Company Inc.

CALL ERIC BRADSHAW AT 609-452-2000, EXT. 2678

WORRIES from page 15

marily in Cobol. The Focus programmers "tend to be more service-oriented," he said. "They take pride in being responsive to the user community and in seeing something produced in minutes."

Most users agreed that productivity tools are most popular with the younger staff members. "New users seem to have the easiest time because they don't have to relearn programming to use [tools like Focus]," Morgan said. But, he noted, the younger staff members are often not skilled enough to perform the detailed analysis that is often required of them.

"Focus is a single-user type of product, where one person does the analyzing and coding," he said. "That's a real problem for the older programmers who know how to analyze, but aren't as comfortable using the language."

NEWS

Niosh officials still noncommittal in VDT safety debate

Congressional testimonies unlikely to mollify either side of the issue

By John Klinehamer
OF Washington Bureau

WASHINGTON, D.C. — The National Institute for Occupational Safety and Health (NIOSH) sits squarely in the middle of the debate over possible VDT health effects — a situation unlikely to change, according to the recent congressional testimony of several agency officials.

While not exactly fence-straddling, the officials indicated they are unwilling to come down on one side or another of the controversy until they complete additional studies of VDT use. One study, now in preparation, should yield the data necessary for a final opinion on whether VDTs cause reproductive problems; a study to test for possible adverse effects on vision is being considered.

String of "Yes, but" remarks

The May 15 testimony of Niosh Director Dr. J. Donald Miller and two of his associates was a string of "Yes, but on the other hand" statements that are not likely to mollify either side of the debate. In quick succession, Miller told the Health and Safety Subcommittee of the House Committee on Education and Labor that: "We do not find VDTs to be a source of dangerous radiation. Yes, there is some evidence that VDTs can increase both physical and emotional stress in workers."

"Although we do not see any physiological mechanism whereby VDTs could impair reproductive function, as yet we do not have the information to definitively rule out an effect of VDTs on reproduction."

"Niosh laboratory findings" may suggest that the visual complaints of VDT operators represent discomfort, but have no more serious significance. Long-term studies have not yet been done, thus questions about the cumulative effects of visual strain due to [VDT] viewing remain unanswered."

Subcommittee Chairman Rep. Joseph M. Gaydos (D-Pa.), who has overseen a year-long investigation into this matter, spent an hour trying to extract a more definitive answer from the Niosh officials. Pressed on possible dangers from VDT chemicals, X-rays, gamma rays, ultraviolet light and static charges, Miller replied, "The answer to all this lies in a definitive research effort."

Serving as an possible radiation dangers — the most likely cause of reproduction and vision damage, if indeed VDTs are dangerous — Gaydos asked why previous studies have uniformly exonerated VDTs. "Are we spinning our wheels? Are we wasting our time? Is there an old scientific evidence that we're talking about dangerous radiation?" he asked.

Miller told Gaydos that "we are not satisfied that we know what the effects of long-term, chronic use of VDTs are. . . . We are not satisfied with the currently available data."

Dr. Barry Johnson, director of Niosh's Division of Biomedical and Behavioral Sciences, told the subcommittee that government laboratory tests showed that VDTs under ultimate stress/failure conditions can cause X-ray emissions in excess of standards for television sets.

Gaydos asked if this meant an operator could have a dangerous instrument in front of him.

"It is not inconceivable that [this

condition] could happen in the workplace," Johnson replied. But, he added, it is highly unlikely that such a machine failure would go unnoticed by the VDT operator. While a definitive ruling in the VDT safety debate awaits the outcome of the agency's long-term study, Miller said Niosh will continue to investigate complaints of VDT harm as agency resources permit. Although he is banking heavily on the three-year study, Miller also admitted that "there is an element of the unknown here. There may be some mysterious impact to the VDT problem] that we simply do not know about."

Niosh offers steps for easing VDT-related health ailments

WASHINGTON, D.C. — Periodic eye exams and regular work breaks for VDT operators are two of the basic steps organizations can take to ensure the comfort and health of their personnel, according to the National Institute for Occupational Health and Safety (NIOSH).

Although NIOSH knows of no scientific evidence pointing to permanent or serious health dangers from VDT use, the agency continues to study the issue. In the meantime, the agency is aware of the frequent VDT operator complaints of transient visual and musculoskeletal problems and stress, according to Niosh Director Dr. J. Donald Miller.

Recognizing "the state of knowledge regarding ergonomic, stress and radiation issues in VDT work," he said, the agency recommends the following "general guidelines, which may require modification in specific situations":

• **Workstation design.** Maximum flexibility should be designed into VDT units, supporting tables and op-

erator chairs. VDTs should have detachable keyboards, work tables should be height adjustable and chairs should be height adjustable and provide proper back support.

• **illumination.** Sources of glare should be controlled through VDT placement (i.e., parallel to windows as well as parallel to and between lights), proper lighting and the use of glare-control devices on the VDT screen surface. Illumination levels should be lower for VDT tasks requiring screen-intensive work and increased as the need to use hard copy increases.

• **Work regimen.** Continuous work with VDTs should be interrupted periodically by rest breaks or other work activities that do not produce visual fatigue or muscular tension.

• **Vision testing.** VDT workers should be given vision testing before beginning VDT work and periodically thereafter to ensure that they have adequately correct vision to handle such work.

Fourth Generation Productivity Enhancements for the SAS® SYSTEM

Turn the power of SAS into a total information system for decision support...with DS/Software. Four fully integrated products let you tap the unrivaled power of the SAS System in a user-friendly environment. So you have immediate, organized access to the information you need for sound decision making.

DS/OL An easy-to-use SQL-based query language for SAS. Allows you to ask complex questions of the data base in the form of English-like queries using SELECT...FROM...WHERE expressions.

DS/DB A direct-access facility for SAS data sets that increases your data access efficiency without increasing your programming effort.

DS/DM A full-screen interactive dialog manager that gives you immediate, total access to your data base and dramatically cuts down on training and technical support.

DS/GEN An interactive dictionary-driven information system generator. Allows you to define, generate, maintain and restructure your DSS.

info tech

The Information Technology Company

Tell me interested in a total information system for decision support. Please send me more information on DS/Software and my free trial offer.

NAME _____ TITLE _____
COMPANY _____ STATE _____ ZIP _____
ADDRESS _____
CITY _____

OPERATING SYSTEMS _____
P.O. Box 14045, Gainesville, FL 32604 (904) 375-7624
INFO TECH _____
SAS is a registered trademark of the SAS Institute, Inc., Cary, North Carolina. DS/OL, DS/DB, DS/DM and DS/GEN are trademarks of Info Tech.

COMPUTER MARKETING EXECUTIVES

Qualified leads cost you less
than \$25 each, delivered to
your showroom at:

COMPUTER TECHNOLOGY CENTER

CALL US TODAY
SAMPLE SHOWROOM NOW OPEN

1828 W. Olympic Blvd. • Los Angeles, CA 90015 • (213) 385-8116

NEWS

Consultants question computer's impact on workplace



ON AT ICCA

HOUSTON — The impact of computers on the workplace was called into question at the recently held annual meeting of the Independent Computer Consultants Association (ICCA) here, with representatives from the consulting and the vendor communities tackling the issue.

IBM's vice-president of marketing, F. G. Rodgers, labeled as a myth the charge that computers are causing worker alienation, a myth that can be

dispelled with education.

Jon E. Seidel, head of EDP Consulting, Inc. of Oakland, Calif., rebutted Rodgers' view, claiming that his consulting experience has demonstrated the concerns of workers about the unknown impact of computers on job futures.

"It is a very, very significant issue. It is the issue of control, the ability of the machine to dictate the pace of work that the human does. I've seen very little appreciation of this point," Seidel said.

"I think we are going to be forced to deal with job displacement," Seidel continued. "The automation of the workplace means that the worker

has to have higher and higher job skills, when in fact he can't find a job because he does not have the skill. Retraining is something that has to be faced," Seidel said.

Seidel said large vendors, like IBM, owe society the responsibility for easing the social dislocation that may be one side effect of introducing automation into the workplace.

IBM's Rodgers told the ICCA convention that the increased spread of technology through society is resulting in a "rising tide of knowledge workers," who see technology as a means to acquire knowledge. Rodgers said these converts were more concerned about quality of life issues

than older generations may see as a challenge to the work ethic. He said it is necessary to seek a balance between the two competing viewpoints, adding that IBM has a duty to pay civic rent or fulfill its social responsibility.

Afcu meet to cover security

ROBLYN, Va. — Security for federal government computers is the focus of the fifth annual Seminar on Security of Federal Automated Information Systems, which will be held on June 11-12 here at the Westpark Hotel.

Sponsored by the Association of Federal Computer Users (Afcu) Special Interest Group on ADF Security and Auditing and the graduate school, U.S. Department of Agriculture (USDA), the seminar will focus on protection of mainframe-to-micro-computer data. Topics will include keeping pace with changing technology, status of computer security legislation, changing management direction, upcoming changes to federal directives and new trends in audit techniques.

The registration fee is \$125. More information is available from the Afcu Security Seminar, Graduate School, USDA, Career Planning and Development Programs, 600 Maryland Ave. S.W., Washington, D.C. 20024.

Mumps users set June 4 meet

PHILADELPHIA — The 13th annual conference of the Mumps users group will take place June 4-5 at the Adam's Mark Hotel here.

The conference will consist of presentations, tutorials, workshops and roundtable discussions focusing on issues involving the Mumps programming language. An exhibition of suppliers in the hardware, software and systems fields will be held in conjunction with the conference.

Registration for the full conference is \$150, or \$120 for Mumps users group members. One-day registration costs \$70.

More information is available from the Mumps users group, Suite 306, 4321 Hartwick Road, College Park, Md. 20740.



Your Most Precious Resource

In any business, time is money! This is especially true when dealing with Data Communication Networks where system performance and RESPONSE TIME is critical to the user.

Degradation of system performance (responsive-ness) is inevitable as customer work loads increase. Installing faster, more sophisticated hardware is a popular but temporary solution. It is only a matter of time until the problem reappears.

Questronics offers a solution through statistical performance analysis of your system. Over seventy-five categories of line utilization and response

time information can be generated in eleven different reports (hard copy and/or data based).

Questronics model CPAT is setting the standard in the industry by providing vital performance statistics in the areas of:

- Classification Response Time
- Line Utilization
- Character Transmission Counts
- Poll List Wrap Time
- Transmission Errors
- Holdings
- Holdings
- Holdings

Utilizing this information, DataCom managers can then make the crucial decisions necessary to fine tune and balance the network.

Each line may also be further refined to greater efficiency, enabling planning and projection for new growth.

Call Questronics and discuss your situation. We'll give you straight answers.



Answers through Analysis
QUESTRONICS INC.

3505 South West Temple, #5 • Salt Lake City, Utah 84115 • (801) 262-0823 • TWX 910-925-4000



NEWS

Ethics of Big Eight involvement in DP services debated

Accounting firms' role in consulting business seen conflict of interest


SW AT SOCA

By Helen Wilkins
CW Washington Bureau

HOUSTON — The Big Eight accounting firms, which perform most independent audits on U.S. corporations, have a booming computer systems consulting business going on the side, a business that independent consultants would like to stop.

At the annual Independent Computer Consultant Association (ICCA) meeting here May 17, a debate ensued over the ethics of the Big Eight's recommending computer installation and software management systems to clients while performing audits of the same companies.

The debate was not unlike the controversy that has for years smoldered within the ranks of the Association of Data Processing Service Organizations, Inc. (Adapso). The vendor organization has openly attacked the Big Eight's selling software and DP services to its audit clients, arguing such sales violate federal rules designed to ensure the independence of corporate audits.

The ICCA had invited a representative of a Big Eight accounting firm to a debate to be moderated by a U.S. Securities and Exchange Commission (SEC) official. However, the Big Eight spokesman did not show, even though he was scheduled to appear well in advance of the conference.

Ignoring the issue

"This is quite representative of the way the Big Eight accounting firms try to ignore the issue," exclaimed Walter Ulrich, ICCA conference chairman and president of Walter E. Ulrich Consulting of Houston. "They turn down every opportunity to debate it. And now this no-show is symptomatic of how they hope the issue will go away."

Edwin Tomko, assistant regional administrator of the SEC, said the computer consulting work by accounting firms was an important issue for the agency. "From our point of view, the independence of the accounting firm is the key issue. We are very concerned about the independence because we have to be able to determine what kind of work the firm has done," Tomko said.

Although there are no reliable statistics giving the revenues derived from computer systems consulting work by the Big Eight, Ulrich claimed that estimates showing over 25% of gross revenues of some Big Eight firms derived from this source are conservative.

"We have pretty reliable figures that show, for example, that [Arthur Andersen & Co.] — one of the Big Eight — is getting 22% to 26% of its revenues from nonaudit activities," Ulrich said, citing figures also used by Adapso in a series of briefs filed with the SEC last year.

Douglas Jerger, a former accountant with a Big Eight firm and now an independent consultant with Software Design Associates, Inc., said two principal issues are present in the controversy. One is the indepen-

dence required by the accounting firm to conduct an accurate audit of a firm, and second, the issue of fairness and competition.

"We are just saying we don't want a disaster to happen when we can do something about it beforehand," Jerger said. He recommended that accounting firms be barred from the consulting business or at minimum be required to forgo audits of companies where they have performed computer consulting work.

Several ICCA members pointed to the recent contract awarded to Arthur Andersen to install an electronic

data-gathering and retrieval-filing system for the SEC as an example of the potential conflict that can exist between consulting and auditing.

Since the SEC regularly receives the financial information filed by companies, the accounting firm with knowledge of the screening criteria would also be doing outside auditing work of firms that would be screened, observed the ICCA members.

The contract to Arthur Andersen to install a text automatic filing system is worth an estimated \$6 million to \$8 million over two years. The

firm that lost on the bid to install the system at the SEC, Aspen Systems Corp. of Rockville, Md., earlier this month lodged a protest with the SEC alleging a potential conflict of interest on the part of Arthur Andersen.

SEC officials have been quoted as saying they reviewed the possibility of Arthur Andersen's conflict of interest between installing the system and conducting audits of firms that would use the system, concluding there was adequate separation between the two lines of business. No action has been taken by the SEC on the protest.

You name it. Chances are we can service it.

More than 4,500 service experts across the country are ready to fix your equipment. Almost any make, model or type there is.

Western Union Field Service is one of the largest, best qualified service teams in the nation. And we're ready to install and maintain everything from complete networks and communicating systems to individual CRTs, microcomputers and printers.

What's more, we're

fast. With over 350 strategic locations, we cover every state in the Union, and can be anywhere you need us in a hurry. To find out about service contracts, or just get more information about what we can do for your brands, call toll-free 800-222-0885 (in New Jersey 201-934-0200). Telex us at 642-474. Or send your business card to Tom Quinn, Vice President, Western Union Field Service, One Lake Street, Upper Saddle River, NJ 07458.

Western Union Field Service.

Nationwide, single-source service.

Rockwell International eliminates order management paperwork and ships products faster with a Tandem NonStop[™] Computer System."

Rockwell International
A Division of Rockwell International Corporation
Cedar Rapids, Iowa 52402

Our Tandem NonStop computer helps us dramatically streamline order tracking for our broad line of products here at the Collins avionics facilities in Cedar Rapids. This automated operation has meant we've been able to ship our products faster, as we respond to customer inquiries in a much more timely, accurate fashion.

The Tandem system consolidates all data pertaining to the orders, from order entry to scheduling, inventory, issue to packing lists, and

right on down the line to shipping. And, because the system is on-line, other departments have immediate access to this information as well.

Accounting, for example, now generates invoices automatically, resulting in much improved cash flow. Manufacturing is saving \$175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures, and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year.

Other system benefits contributing to our improved

customer service include better control of backorders, more accurate pricing information, and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System.

Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business.

Tandem. Fully supported by a worldwide sales, training, service and manufacturing organization.

For information on how a Tandem NonStop system can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated, 19333 Valico Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336 or 408-725-7500 in California.

TANDEM

NonStop Transaction Processing

NEWS

Minneapolis approves controversial pact with SCT

Union argues city should hire permanent employees to restructure DP department

By Edward Warren
CW Staff

MINNEAPOLIS — The Minneapolis city council has unanimously approved a \$1.1 million contract with Systems and Computer Technology Corp. (SCT) to provide the city's data processing department with needs analysis and training. The approval came despite the claims of one of the city government's unions that the contract would lock the city into a long-term and expensive arrangement with the firm.

The Minnesota Professional Employees Association (MPEA) had

lodged its disapproval of the contract at a council committee meeting a week prior to the vote. The union said that although SCT was the low bidder, the city should hire permanent employees to restructure its data processing department.

The union also called the council committee's attention to a published report which told of complaints being leveled against SCT in connection with its contract with a Detroit-area community college. The complaints charged, among other things, that SCT had provided outdated software and inexperienced employees while

carrying out its five-year contract to upgrade the Wayne County Community College computer system (CW, Jan. 30).

That contract, awarded in 1979 for \$3.3 million, has since netted SCT \$8 million, largely from contract extensions, according to news accounts. The extensions may have violated Michigan's competitive bidding process, a matter currently under investigation by the Michigan Department of Education, the *Detroit News* reported.

Minneapolis DP Director Stan Gabriel, asked by the council to review

the union's claims against SCT, said he was aware of the Michigan investigation and yet felt reassured that "a lot of the claims against SCT were positionally motivated." Gabriel said he talked with officials at "many sites" where SCT had performed services and found most of them satisfied with the firm's efforts.

Gabriel recommended to the council that the SCT bid be approved, and the council did so early this month. The firm, he said, had the "best qualifications for what we are looking for."

"Band-Aid approach"

But MPEA union steward Ron Hudson, one of 25 analyst/programmers in the city's data processing department, claimed that the city has "taken a Band-Aid approach" in solving the city's DP problems and said that the contract with SCT could be "renewed continually."

Gabriel admitted that the city isn't certain what is specifically wrong with its data processing department and that SCT's first task will be to conduct a study to determine where problems lie and how they can be corrected.

The results of that study, he said, "will be the deliverables" from the consulting firm. SCT will provide the department with a specialist in systems and programming, a senior analyst and two other workers whose responsibilities will be determined by the findings of the study.

Gabriel said the relatively low pay of the state's civil service system would have made it unable to recruit employees with the expertise needed to revamp the data processing department.

NCC attracts 650 exhibitors

LAS VEGAS — More than 650 companies plan to exhibit hardware, software, peripherals, accessories and publications at the National Computer Conference, which will be held July 9-12 at the Las Vegas Convention Center and Hilton Hotel.

The NCC '84 exhibition of existing products and developments will feature more than 20 product categories, said Russell K. Brown, conference chairman.

Exhibition hours are 10 a.m. to 5 p.m. on Monday, July 9, and 9 a.m. to 5 p.m. July 10-12.

Registration fees are \$100 in advance or \$125 on site for the full conference and exhibition, \$40 for one day of the conference and exhibition and \$35 for only the four-day exhibition.

NCC is sponsored by the American Federation of Information Processing Societies (AFIPS), Association for Computing Machinery, Data Processing Management Association, IEEE Computer Society and Society for Computer Simulation.

Further information on the conference can be obtained through NCC '84, AFIPS, 1860 Preston White Drive, Reston, Va. 22091.

Enter 10 on Reader Service Card
The New Age of
Performance Management

The first professional computer that looks at information the way you do.



Place any document under the scanner, push a button and in seconds...



...it will appear on the monitor. You can store the whole document or isolate just part of it.



You can relocate any section...



...and add text to create a new document, which can be printed or stored.



Filing out forms is a snap. Just place a form under the scanner...



...and fill in the blanks and update your database. Use the cursor (under "floor plan")...



...to bring up other image or data files associated with the original document.



Picture-perfect copies can be printed in seconds.

If you're in business, you get a lot of information exactly the way you're getting it right now.

From a piece of paper.

And a lot of time and money goes into managing that information.

But now Wang is introducing a computer that can help you manage that information even better.

The Wang PIC™ image processing system.

With the Wang PIC, business information can be scanned, displayed, edited, filed, printed, and sent anywhere in the world. Documents can be enlarged, reduced, landscaped, and contrasted. All from one desk-top computer.

The Wang PIC can communicate with other Wang computers and even most mainframes.

And you can start with a Wang Professional Computer. (A computer that already offers the best-selling word processing in the world and the most popular business software —



including Visi On, Lotus 1-2-3, and TK Solver™.) And then grow to an image processing system with a simple upgrade.

If you would like a demonstration of The Wang PIC image processing system, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

But do it today.

Because this is one new product you don't want to overlook.

WANG

The Office Automation Computer People.

NEWS

Symposium attendees voice concerns about net standards

CAMBRIDGE, Mass. — Users attending the recent MIT symposium on networked computer systems here brought a number of concerns to the May 14 event, but many declined to bring them into the open.

Prof. Michael L. Dertouzos, director of MIT's laboratory for computer science and the chairman of the symposium, commented after a morning break that many controversial questions had been raised in the lobby following his broad overview of distributed applications network systems.

In a later interview, Dertouzos said that some users objected to his suggestion that network protocols be limited to one or two and operating

systems be limited to one when plans are laid for a distributed applications network, in which many computers concentrate on one task. These users suggested such an approach was unworkable.

Concerns with standards

Two or three users interviewed by Computerworld shared a concern about standards. Robert Barais, director of process control technology for St. Regis Corp., a paper manufacturer, said he is concerned about standard protocols and operating systems because his company's efforts to get different manufacturers' equipment to work together have

been difficult.

"We're buying [Digital Equipment Corp.] compatible systems from different vendors to perform various functions and trying to get them to work together," Barais said. "The vendors are doing things for their own purposes and aren't necessarily interested in interconnecting. They make it our problem instead of theirs."

Kirk Birrell, a group leader in the engineering division of Eastman Kodak Co., said, "We're especially interested in standardizing protocol." A Management Automation Protocol developed by General Motors Corp. is a good standard for manufacturing,

according to Birrell, who said it may be up to users to pressure vendors to standardize, but that such decisions should be left to technical people and not "politicians."

Alan Carr, a software engineer with Campbell Soup Co., which has over 60 plants in the U.S., said that Campbell is interested in a distributed network to be used for factory automation.

"We'd like to control processes on the factory floor and get data out for controlling and monitoring," Carr said. He is concerned about methods for authenticating and verifying commands sent between network nodes.

Distribute your creativity.

New INGOT makes decision support applications portable.

Introducing a real time decision support system—INGOT—a fourth generation language that allows you to share information in new ways.

Models and data files can be moved to almost any combination of mainframes, superminis, and minis. So, if you have an information center here, a subsidiary there, and a departmental computer somewhere else, just put INGO on each machine. IBM, VAX, DG, PRIME, HARRIS, UNIVAC, TANDEN, Wang, etc., etc. are just alphabet soup to INGO.

PC TALK

PC's and WP's talk to INGO without special software. Upload and download. Move models and data files with ease using the same software you already have. Expand Lotus, dBase II, and Calc's

into true decision support.

INGOT handshakes with other programs through a standard flat file interface. INGO

models can access data base systems, pass data to color graphics programs, and execute programs in other languages. INGO amplifies your existing software assets.

SIMPLY POWERFUL

English-like commands do time series forecasting, Monte Carlo simulation, simultaneous equations, LP optimization, statistical curve fitting, and more. Sales forecasting and optimal manufacturing scheduling can be integrated into a single model using INGO.

What's your application? Financial consolidation?

Long range forecasting? Employee evaluation? Departmental budgeting? Spread sheets?

What project selection? Customer credit analysis? Transportation scheduling? Cash management? Monitoring competition?

With your creativity, there are probably 10,000 portable applications you can build in INGO.

Serious model builders love its power. Yet spread sheet users graduate easily to INGO's fourth generation capabilities. INGO satisfies more needs and more users with the same DFP.

BUILT-IN MODELS & GRAPHICS

Proprietary models are built-in as single commands to save users time. From replacement value accounting to stock price estimation, there's nothing like INGO.

Draw a floor plan and insert cost estimates. Draw a map and show sales by region. Ordinal pieplots, lineplots, Gantt charts, and bar graphs are one line-commands.

HELP+

100% of the user's manual with 200+ examples can be accessed on-line by typing HELP. Add your own HELP messages to the system too. User training, consulting, and hot line support assure your success.

ACT NOW and call or write for more information.
800-323-7820 or 312-869-5556.

SCHONFELD & ASSOCIATES, INC.

COMPUTER SOFTWARE—COMPUTER BASED PUBLISHING—
MANAGEMENT CONSULTING
2300 Crawford Avenue, Evanston, Illinois 60201

INGOT
A COMPREHENSIVE DECISION SUPPORT SYSTEM

INGOT was developed by Schonfeld & Associates, a 7 year old computer software company. All customers include about half the Fortune 500. INGO was designed from experience and has been used as a 3rd level tool for years.
Lotus is a trademark of Lotus Development Corp. dBase II is a trademark of Ashton Tate.

ACM to discuss future trends

GAITHERSBURG, Md. — Current and future directions of computing are the focus of the 22nd Annual Technical Symposium of the Association for Computing Machinery (ACM), to be held on June 28 at the National Bureau of Standards here.

The keynote speaker is Robert M. Worthing, vice-president of Government Information Systems Co., a subsidiary of Planning Research Corp. The featured speaker is Ed Youdon, founder and chairman of Youdon, Inc., a consulting firm.

Topics to be addressed include: understanding the software paradox; quality control model for software development and support; the role of computers in education; human factors in computing; software development using Ada; communications/networking; and optical disks.

Registration is \$66 by June 1 for ACM members and \$66 thereafter. Registration for nonmembers is \$60 by June 1 and \$70 thereafter. The cost for the proceedings only is \$15.

More information on the symposium is available from Will Edwards, 4812 1st Avenue N.W., Washington, D.C. 20011.

Adapso to hold financial forum

NEW YORK — The Association of Data Processing Service Organizations, Inc. (Adapso) will conduct its 11th annual Computer Services and Software Industry Financial Forum on June 4 at the Waldorf Astoria Hotel here.

Peter Cunningham, president of Input, Inc., a market research firm, will present an Adapso report titled "The 18th Annual Survey of the Computer Services Industry."

During the forum, executives from more than a dozen computer companies will meet with members of the financial community to discuss recent earnings figures, marketing strategies and investment plans.

Registration costs \$75 from Adapso, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

NEWS

Speaker offers tips on distributed systems planning

By John Deane
CW Staff

CAMBRIDGE, Mass. — At a recent symposium here on networked computer systems, Prof. Michael L. Dertouzos, director of MIT's Laboratory for Computer Science, outlined what not to do when beginning to plan a distributed system:

Don't go out and buy personal computers as a means of expanding a central system.

Don't spend all your time deciding the Ethernet-ring net question. Worry instead about what information will flow through the system.

Don't buy the "new, bigger, single machine that will solve all your problems."

Sharing advice he has given to the White House, MIT itself and two large banks, Dertouzos advised symposium attendees to "be city planners, not building architects."

Three-part plan

He recommended a three-part plan:

■ First, decide on geographic distribution and needs of users for the next five to 10 years. This has been MIT's own approach in Project Athena, a five-year experiment in using hardware and software from Digital Equipment Corp. in a 3,000-workstation network.

■ Second, estimate the number and location of local-area networks and determine which type of "spine" (twisted copper wire, coaxial cable or fiber optics) should connect the networks.

■ Third, make the best current decisions about technology — but plan for the future.

Dertouzos recommended that as an initial goal, companies should choose a distributed system architecture that can arbitrarily scale up, perhaps to 10,000 users. To achieve reliability, he recommended the atomicity approach, which essentially acknowledges that either all or none of the contents of an atomic envelope were delivered, the envelope containing bits of information. This is what MIT is trying to achieve with its Argus protocol language, now in the development stage.

Moreover, Dertouzos advised, companies should settle on a small set of realistic standards, such as one or two network protocols and one operating language. (He said Unix is being used for Athena.)

Disseminating opinions

But the MIT staff is not unanimous in its support for such a limited number of standards. Dr. David Clark, of MIT's Laboratory for Computer Science, suggested it is unrealistic to project use of one or two protocols and one operating system. "Supporting multiple standards is the reality that will be forced on you," Clark said at the symposium.

Transition from protocol to protocol and operating system to operating system is another stumbling block to distributed applications systems, in Clark's view. "You know the saying, 'A little bit gets lost in translation.' Well, computers deal very poorly with a little bit being lost," he quipped.

Prof. Jerome H. Saltzer, who spoke on linking local-area networks, was even more pessimistic about transla-

tion. "It's practically hopeless to come up with a reasonable translation approach," he said. Specialized translators or "trusted intermediaries" are the best approach, Dertouzos he advised, citing banks and credit bureaus as present-day examples.

Clark suggested that big battles loom in the struggle for open standards for protocol languages, needed so that translations can be written. While the U.S. Department of Defense's TCP/IP protocol and Xerox

Corp.'s XNS protocol were published openly, many vendors refuse to publish their protocols, he noted.

Clark's vision of the future is that a few open protocol standards will dominate in three to five years; closed, or vendor-specific, protocols will persist because no company will give up a set of specifications to adopt one that it doesn't control; and multiprotocol machines will become common.

But Clark was pessimistic about the chances for opening protocol

standards, saying companies will be reluctant to give up a perceived competitive edge, and the investment community may raise objections about a loss of control. Comparing the state of affairs to a current event, Clark said, "You really need a World Court, and the vendors will deny the World Court has any jurisdiction over them."

From Clark's point of view, the technology is here now to implement distributed application systems, but decisions to be made are "completely political at this point, almost totally nontechnical," and thus out of MIT's ballpark of developing technical solutions.

Finally, SQL For The PC!

For the PC user

QINT/SOL

The 100% IBM compatible relational database system. At the programmer and user level, identical to IBM's SQL for mainframes.

English Like Language

Easy to ask questions and get answers. Type in questions on your PC or microcomputer rather than searching through reams of output listings for desired information.

Access data from the IBM mainframe computer on your PC-XT or microcomputer and handle it yourself, without need to program or fear of altering databases.

QINT/EXPERTS

For hotline, user, and technical support.

QINT/Computer Aided Training

Self-Teaching Module, runs on your PC.

For the EDP Professional

QINT/SOL

For the microcomputer, identical at the programmer level to IBM's SQL/DS and Database-II systems on 4300 or 30X0 mainframe.

QINT/IAM - Information Analysis

Methodology to allow design and installation of databases with the user's participation. Base the database system on plain English. ISO Standards compatible 3 schema approach.

QINT/TINA-Tools for Information

Analysis. A Data Dictionary System that generates the tables and all the documentation for your database.

QINT/ADT - Application Development

Tools. Automatic generation of commands. Generation of code for SQL (embedded in COBOL or Pascal) or ISQL (interactive).

Hardware and Operating System Independence: MS-DOS, MP/M, Concurrent CPM, and UNIX. Any hardware using 8086, 8088, 8080 or compatible.

The following are trademarks of:
UNIX/Bell Labs; MS-DOS/Microsoft;
MP/M-CP/M/Digital Research;
8086 & 8088/Intel; 8080/Intel;
SQL/International Business Machines.

For more information please write:

QINT Database Systems Corporation

50 Wabash Hill Road North
Chesham Hill, MA 02167
or call 1-817-527-6239

NAME _____

TITLE _____

COMPANY _____

CITY _____

STATE _____

ZIP _____

YOUR MOVE

For multi-user on-line systems, your customers demand 32-bit price/performance, UNIX, and data integrity. Make the right move.

One move can give you a sizable advantage in your markets. And, it's available now from Tolerant Systems—the Eternity Series™ on-line transaction processing system.

Eternity's 32-bit supermini performance gives you a strategic edge over your competition, while its supermicro price lets you expand your markets and increase your margins.

And, its UNIX™-compatible operating system gives you integrated transaction management, enhanced file management, application portability, and data integrity.

Without data integrity, your on-line solutions risk bottom-line problems. With Eternity's data integrity, not even a failure in mid-transaction can corrupt or destroy your customer's data. And, the transaction restarts immediately upon system restoration—with current, accurate data.

Eternity's advanced system software also features powerful application generation tools for

increasing your developers' productivity and accelerating your time to market. These tools include a screen-based forms manager, a relational DBMS with end-user access, and an application system manager.

So, if your markets demand high-performance transaction processing and UNIX with data integrity, make the right move. The Eternity Series is available now.

Learn more about Eternity by contacting Shirley Henry, Director of Marketing, Tolerant Systems, Inc., 81 East Daggett Drive, San Jose, CA 95134, (408) 946-5667, TELEX 278860.

Tolerant
systems

The Right Move.

The Eternity Series from Tolerant Systems is designed to operate in Class II office environments.
UNIX™ is a trademark of Bell Laboratories.
Eternity Series™ is a trademark of Tolerant Systems, Inc.

NEWS

Evaluate systems security immediately, bankers told

By Peter Sherlian
CW Staff

BOSTON — Banks are not likely to find any respite from the pace of technological advancements, so top executives should take immediate steps to evaluate and implement computer security procedures, a data security consultant and criminolo-

gist recently told bankers here.

Dr. Sanford Sherlian, president of Data Security Systems, Inc. of Natick, Mass., and a faculty member of Northeastern

"Today's bank robber has traded in the tommy gun for the terminal and uses software instead of a sledgehammer."

Dr. Sanford Sherlian, president, Data Security Systems

College of Criminal Justice, placed responsibility for data security at the level of

the chief executive officer during his remarks before a forum session of the American Institute

of Banking at Boston.

"Security is no longer an option," Sherlian told the

bankers. He noted that mechanisms and procedures for data security are available, but require a commitment by executives to security. "Computer crime is to a large degree preventable, but it requires the involvement of top management."

Data entry workers with limited skills and limited supervision pose one potential threat to security, and providing customers with "user-friendly" interfaces to computerized equipment can make data "very friendly with the wrong users," Sherlian said. "Today's bank robber has traded in the tommy gun for the terminal and uses software instead of a sledgehammer."

The key to adequate security, he declared, is to use the existing organization for security purposes. That requires a top executive to be "an active supporter, an active facilitator and an active supervisor" of security policies and procedures.

Sherlian maintained top management should determine what is being done about computer and electronic security; what should be done about security; and what can be done given a firm's resources.

Following that, management can then determine whether the firm has an effective security policy; how secure the computer system is; what are the most vital assets to be protected, whether employees always adhere to the security policy; and whether security personnel have direct contact with top management levels.

Sherlian declared that "unless security policies and procedures are written, tested and implemented, they are going to be worthless."

STAY AHEAD OF THE PACK KEEP ABREAST!

Subscribe to
COMPUTER PROFESSIONAL
ISSUES, ETC.

Comp Reports of Business, Technology
and Product Developments.
8 issues per year - 8 packed pages
per issue

Order your subscription now
Send Coupon and Payment to:
DATAWARE CORPORATION

P.O. Box A-332, Haverhill, MA 01828
Phone 978/371-1111

☐ 1 year Charter Subscription
\$1495 (12 issues)

☐ 1 year Regular Subscription
\$1195 (12 issues)

☐ 1 year Regular Subscription
\$1195 (12 issues)

☐ 2 issues issue
Prepaid - \$8.00

Payment method:
☐ Check or Money Order Enclosed

☐ Bill me Regular Subscription Only
☐ Credit Card ☐ VISA ☐ MasterCard

Card No. _____
Expiration date _____

Signature _____
Name (Print) _____
Address _____
City _____ State _____ Zip _____
Subscriber Guarantee: Subscription
Refund: Refund on request.

NEWS

Study reveals duty of securing computer data shirked

Responses from Dayton survey may be indicative of national attitude

By Robert Eust
CW West Coast Bureau

DAYTON, Ohio — If a recently completed study of local firms is indicative of the nation at large, most companies suffer from the "who's in charge here?" syndrome when it comes to responsibility for securing vital computer information.

Wright State University's Center for Industrial and Consumer Studies here found that at 15% of 204 companies interviewed in the Dayton area, no one is in charge of securing data. Ten percent of the study's respondents identified the chief executive or chief financial officer as the person responsible, while only 8% claimed the data processing director had chief responsibility for computer media security.

Of the remaining firms surveyed, responsibility for computer records was spread thinly across many different people and departments, including treasurers, controllers, operations departments, records and administration divisions and even mail room workers and secretaries.

"The survey was conducted by telephone, and our aim was to interview the person responsible for the security of computer-related systems. In many cases, however, we had a great deal of difficulty

simply finding out who we should talk to," commented Tom Doval, associate professor of marketing and the person responsible for conducting the study.

According to Doval, the 204 companies interviewed represent a cross section of

standard industrial corporations throughout the U.S., ranging from small businesses to Fortune 500 companies. For these companies, natural disasters are a major concern when it comes to securing computer media, with around 30% of the respon-

dents saying this is their chief worry. A further 14% expressed a fear of corporate sabotage, while 11% said the computer hacker worries them the most.

Commissioned by Secured Data Services, Inc., an Ohio-based firm specializing in the

off-site storage of computer data, the study found that 97.5% of the computer specialists interviewed stored their data base on-site. At the same time, 95% of the companies interviewed expressed concern about the

See SECURITY page 30

EVERYONE
WILL BE MAKING
HIGH SPEED
MODEMS LIKE
THIS
IN THREE OR
FOUR YEARS

IACSS adds new grade

DIX HILLS, N.Y. — The International Association for Computer Systems Security, Inc. (IACSS) has announced the creation of an associate grade of its computer systems security professional certificate.

The associate grade will be granted to individuals working in the computer security field who have not completed the experience and education requirements for senior certification. They must pass an examination testing their knowledge of computer system security fundamentals, said Robert J. Wilk, president of IACSS.

Wilk said senior certification is based on a combination of work and educational experience and passing a four-hour written examination, in addition to the associate examination.

Application and examination fees are \$125 for the associate grade and \$175 for the senior grade. More information is available from the Certification Council, IACSS, 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

How did Codex come up with the 2600 Series, a new generation of modems running at speeds from 4800 to 16,800 bps that's so much more advanced than the competition?

By designing a revolutionary VLSI-based signal processing architecture teamed with the powerful Motorola MC68000 microprocessor.

A design that incorporates a unique Adaptive Rate System, which continuously adjusts the transmission speed of the Codex 2600 to the maximum rate the line will support. Allowing you to optimize throughput all the way up to 16,800 bps, without having to lift a finger.

A design that ensures data reliability with Trellis Code Modulation (TCM)—a significant advancement over uncodified modulation techniques in common use today.

In multipoint applications, the Codex 2640 can even handle mixed 9600, 7200 and 4800 bps inbound rates. So each drop can operate independently at maximum speed and efficiency.

Of course, with the Codex 2600 Series, network control is standard. So you can monitor line and modem performance from the front panel or from a central Codex DNCOS system. Plus there's an optional downtime-loading feature that lets you conveniently modify or enhance the functionality of remote, unattended modems.

The Codex 2600 Series. In three or four years, our competitors will probably have modems just like them. If you'd rather not wait, contact Codex today. We'll send you detailed information about these 2600 features and more. Much more.

Call 1-800-621-7700 Ext. 666. Or write: Codex Corporation, Dept. 707-86, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
CORPORATION

At NCC, see us at the Motorola Information Systems Group booth.

NEWS

Speaker recommends off-the-shelf software for banks

By James Connolly
CWI Staff

WASHINGTON, D.C. — Cost, documentation, availability and dependability are among the advantages that off-the-shelf microcomputer software offers when banks face the "buy or build" decision, the American Bankers Association's National Operations and Automation Conference was told recently.

Banks and other companies should look first at commercially produced packages rather than deciding immediately upon in-house software development, said John R. Skrypa, manager of the Corporate Access Development Corporate System for

Chase Manhattan Bank NA.

But while off-the-shelf software may be best for stand-alone microcomputer applications, there remains a shortage of programs that link micros to mainframes, according to Skrypa.

He listed some of the assets and drawbacks involved in various off-the-shelf packages. He noted that those packages simple enough to interest executives may not be versatile enough for executive use, and flexible packages may be too complex for the nontechnical user.

But he reported that front-end systems, which simplify complicated electronic spreadsheets and other

programs, are becoming increasingly available.

He also cited the value of being able to use an off-the-shelf program the afternoon it is purchased, while in-house programs may not be used for several months.

Another advantage of a packaged program, he said, is cost. "Purchasing it will be cheaper, even at a cost of \$4,000 for a single copy."

Skrypa advised the bankers to look first within their companies, whether for increasingly popular in-house computer stores or for advice from coworkers who may already be using the desired software. Other sources for advice on software pack-

ages include hardware vendors, software directories and independent software vendors' advertisements in magazines.

By off-the-shelf programs

"I recommend that, at first, you at least try to buy off-the-shelf software. Even if you don't find what you need, you might come up with ideas that will help you in developing a program," he said.

In-house programs are expensive, take time to develop, often need extensive debugging and may have inadequate documentation, Skrypa said.

Rather than writing programs from scratch — whether using in-house programmers or consultants — banks might consider modifying off-the-shelf programs to meet their needs, he added. But he warned that buyers may find that some programs can't be modified if they are sold without source code. He singled out spreadsheets as being particularly useful when modified for special needs.

Skrypa observed that a shortage of development tools, such as application generators for microcomputers, is another negative factor in a decision to build a program.

SECURITY from page 29

storage of their data.

But the study also found a reluctance to place vital computer information off-site, with only 26% of the companies using backup tapes or storing their backup in an off-site facility.

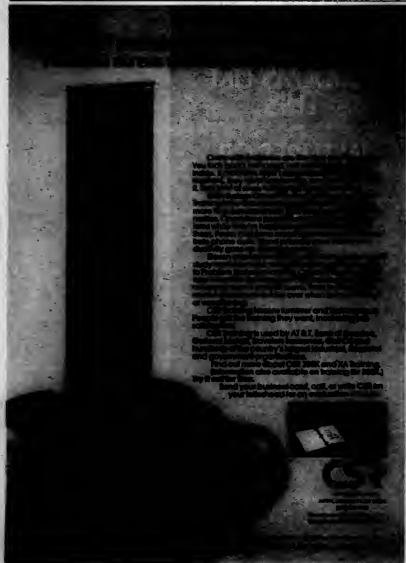
In answer to another question, the study found that while 66% of the respondents regard off-site storage as a solution to their security needs, over 160 of the 204 companies store most of their irreplaceable data at their main DP location.

"The study seems to indicate that many companies are largely ignoring the fragile nature of their computer media. They don't know who's in charge, and so the responsibilities that must follow, such as storage, providing backups (and so forth), are being largely ignored," said James Valentine, president of Secure Data Services. "This is a dangerous situation, considering the fragile nature of computer media when exposed to such things as fire, smoke or water damage."

Commenting on the study's findings, John Porter, a member of the Association of Records Managers and Administrators, Inc., said he was not surprised by the figures. The problem, he asserted, is that responsibility for the security of computer data often rests with three separate parties — the DP department, records and administration staffs and the owner of the data.

Porter, who is manager of records and information management at IBM, said that while the owner has the ultimate responsibility, records managers should play a stronger support role in securing data stored on computer media.

"Currently, too many records administrators do not recognize that computer media is just as important as paper in the storing of vital information," he said.



NEWS

Bankers seen at forefront of potential videotex boom

By James Connolly
CW Staff

WASHINGTON, D.C. — Bankers, publishers and a handful of retailers can be at the forefront of the videotex/videobanking explosion that is expected in the next two years, a group of bankers was told here recently.

Speakers at the American Bankers Association's National Operations and Automation Conference provided bank operations managers and vice-presidents with updates on home banking and videobanking.

"This isn't the type of thing that individual banks are going to be able to pull off, with the possible exception of some such as Chemical Bank and Citibank NA in New York. It's going to require that our little guys work together," said John H. Fisher, senior vice-president of Banc One Corp. of Columbus, Ohio.

Videotex consortium

Fisher urged banks to work together to control the DP sites that will handle home banking, home shopping and other video transactions. His bank and seven banks in other regions last year formed a consortium called Video Financial Service that is planning videotex operations with nonbank organizations.

In a separate address to the bankers, John L. Wolfe of Arlen Communications, Inc. in Bethesda, Md., said, "Newspaper publishers and financial institutions seem to have the greatest interest in developing such interactive electronic packages and to be the anchors of electronic mail. That's because both industries are burdened with the weight of paperwork and expensive delivery systems today."

A handful of progressive retailers, such as J.C. Penney Co. and Sears, Roebuck & Co., and other companies such as American Express Co., IBM and CBS, Inc. also are eyeing, or moving forward in the videotex field, the speakers noted.

Fisher, comparing videotex to the automobile industry, said videotex and videobanking are at the Model T stage, ready to grow with basic, affordable service, as Ford Motor Co. grew with its basic automobile. He noted that pilot projects have been under way for several years and that the explosion in the home banking market should start in 1986 or 1986.

A key to that growth, Fisher said, could be the increasing acceptance of the North American Presentation-Level Protocol Syntax (NAPLPS), a graphics standard that videotex operators hope will be embraced by

personal computer makers.

Improved local telephone communications and the ability to link videotex to video-disk and touch-screen equipment also will spur growth, Fisher said.

Wolfe added that it is important that almost all existing videobanking systems use off-the-shelf personal

computers for text and numbers only, but that the trend in software development is toward the graphics-oriented NAPLPS.

But he also stressed the importance of marketing home banking. "Nobody sits at home at night wishing he were at the bank," Wolfe said. "Unlike other aspects

of today's electronic revolution... at-home video banking isn't considered fun or enriching.

"Videobanking will be pushed into existence by the institutions offering the service. It's unrealistic to expect that consumers will pull it along, as they've done with other electronic services. For

that reason, telebanking will require incentives to encourage customers to use the system. That might involve discounts for paying bills on-line rather than through paper transactions. Or, to look at it another way, customers will be permitted for in-branch or paper-based transactions."

Nicholas International introduces the OEM's dream computer.

The Ebit alternative to IBM 4300/370 series processors.

Nicholas International is a high tech trading company specializing in data processing products and is the North American marketing arm for IBM's largest computer manufacturer, Ebit Computers Ltd.

And the dream came true in the new Ebit 6341 series targeted directly to original equipment manufacturers (OEMs):

- IBM 4300/370 series compatible products
- mini-peripherals
- value-added hardware or software systems integrators

These are just some of the numerous features of the Ebit 6341:

- 100% software compatibility with DOS/VS, DOS/VS, OS/VS, S/VS and VM
- field proven by more than 1000 business users worldwide
- outstanding price/performance relationship
- adaptable packaging for the system integrators
- unique integrated controllers that accept low cost mini-peripherals.

Other features of the Ebit 6341 series include: extended precision floating point; virtual machine assist; program event recording; dynamic address translation; automatic error detection and correction; indirect channel addressing; extended control mode; command retry; clock comparator and CPU timer; and conditional memory sharing. High throughput is assured by the use of up to six I/O channels including both 1 or 2 byte multiplex channels

Ebit supplies computerized systems for the Small Air Force.

with maximum transfer rates of 48 Kba in byte mode and 250 Kba in burst mode and 1 to 8 block multiplex channels with transfer rates up to 3 Mba.

Major Standard Features

- Self-diagnostic CPU with 64 Kb loadable test control storage
- I/O processor with 32 Kb loadable storage
- 3 CPU models: all fully field upgradeable.

Basic Configuration

- CPU Model 3, 5 or 7
- 1 Mb of memory
- 1 byte multiplex channel
- 1 block multiplex channel

- Integrated adapters for system console and initial microprogram loading
- Backup and card cage

Optional Features

- 1 to 7 Mb of additional main memory (in 1 Mb increments)
- 1 additional byte multiplex channel
- 1 to 5 additional block multiplex channels
- Integrated I/O control units available on the byte and block multiplex channels
- Additional 64 Kb control storage
- Integrated channel to channel adapter

Nicholas International markets data processing products and data communications equipment worldwide.

For more information on the Ebit 6341 series call Nicholas International (813) 756-1671 or Telex 757979 Nicholas UD

| | |
|--|-----------------------|
| Nicholas International | |
| 2300 U.S. Highway 19 North Palm Harbor, FL 33563 | |
| Please send me more information on the Ebit 6341 series. | |
| Name _____ | |
| Title _____ | |
| Company _____ | |
| Address _____ | |
| City _____ | State _____ Zip _____ |
| Phone _____ | |
| Telex _____ | |

Business graphics seen converting data to corporate asset

By Jeffrey Hunter
CIT West Coast Bureau

ANAHEIM, Calif. — Business graphics will play a key role in helping MIS directors achieve their ultimate objective of turning data into a corporate asset, according to AUI Data Graphics, Inc. executive Alan Paller.

Paller's observations came during a program session at the fifth annual conference of the National Computer Graphics Association, held here recently.

One of the major trends among MIS managers these days is their growing awareness that systems and data are strategic business tools and, therefore, need to be made as accessible as possible to their end users. Efforts to fulfill this information system ideal will benefit greatly from the ability of graphics to translate raw statistics

and other management data into a form the human mind can easily digest, Paller said.

Another development that will likely influence the graphics arena during the coming few years is the continued proliferation of microcomputers, he predicted. At present, personal computers are limited in their graphics capabilities mainly to producing slides.

But as screen resolutions and computing power steadily improve, the machines' range of graphics applications will substantially widen. Within two years or so, Paller predicted, personal computers will grow fifteenfold to twentyfold in internal

throughput and fivefold to sevenfold in disk storage.

The combination of increased capacity, processing horsepower and other features will significantly enhance microcomputer graphics and make the machines suitable as design workstations by 1995 and desktop mainframes by 1998, Paller said.

In other comments, Paller predicted the eventual replication of mainframe graphics tools in medium-scale departmental systems like IBM's 4300 and Digital Equipment Corp.'s VAX-11 series. "The replication process is already under way in 15 or 20 of the country's biggest companies and will begin to spread to all the

other firms in the next year," he said.

Paller also predicted several other graphics-related trends, including:

- A movement toward high-resolution matrix printing.
- Continuing price cuts that will soon make laser printers the preferred vehicle for producing high-quality black-and-white graphics.
- The development of slideshows whose finished products exceed the comparatively limited resolutions of personal computer monitors.
- The advent of "expert systems" that will automatically adjust graphics layouts and formats to suit different media.

NCGA expands show schedule

ANAHEIM, Calif. — The National Computer Graphics Association (NCGA) next year will expand its conference and exposition program to include the organization's first three regional shows.

Two of the regional events will focus exclusively on the subject of business graphics, Ellen Knapp, NCGA president, announced at the NCGA's fifth annual national conference here recently.

The third will cover the full gamut of graphics-related topics.

The two business-oriented shows will be held here in June 1995 and in Boston the following August. The general-purpose conference will follow in October 1995 in Atlanta and will be cosponsored by the NCGA and its affiliate, the World Graphics Association.

Together, the three regional shows will complement the NCGA's existing national conference, which addresses a broad spectrum of graphics issues and takes place each year in a different city.

The next edition of the national event will be held next April in Dallas.



ANNOUNCING THE THAT TAKES OUT OF GOING TO

The PC World Exposition®: The computer show designed for the busy professional on a hectic schedule.

Other computer shows invite you to spend time learning about computers. We invite you to save time learning about computers. And save money.

Come to the PC World Exposition in Chicago and you'll find scores of exhibits, featuring all the most important state-of-the-art personal computing products — the hardware, software, printers and peripherals changing the face of American business. Products from IBM®, DEC®, Compaq®, Lotus®, Hewlett-Packard®, Epson®, Apple®, VisiCorp® and many more. No games, no hobbyists. Just serious business.

You'll find three full days of information-packed conferences designed to help you choose and use the latest of the new technologies. Sessions led by acknowledged experts — the people making the headlines and bylines in the most respected computer press.

Plus, we'll make sure you don't waste a minute of your precious time wandering around the show hall looking for the exhibits or conferences you've been wanting to see for months. The PC World Exposition format is streamlined for you. Exhibits are easy to find — conferences are scheduled at sensible times.

Put simply, the PC World Exposition is the computer show run by professionals, for professionals. Why waste a day or a single dollar at any other show?

Here's What You'll See

Hardware

- PCs and PC compatibles
- Printers and plotters
- Hard disk and tape drives
- Local and wide area networks
- Computer furniture and accessories
- Plug-in boards, other expansion accessories
- Modems and communications equipment

Software

- Accounting packages
- Word processing
- Database management systems
- Spreadsheets and graphics packages
- Integrated productivity packages
- Communications software
- Mainframe/micro to micro communications
- Legal, medical, real estate, dental applications
- Voice recognition, touch-screen, mouse and other input technologies
- Blank disks and storage media

Featured Speakers



William Dias,
President, CEO and Chairman,
Columbia Data Products, Inc.



David Brunzell,
Publisher and Chairman,
PC World Magazine



John Gantz,
Editor,
Tech Street Journal

NEWS

Supplier strikes pay dirt with fourth-generation tool

HOUSTON — B.J. Hughes Services, Inc., a major supplier of oil well services here, recently found itself in an increasingly common situation. The company's demand for on-line systems development had grown greater than the company's staff of 14 programmers/analysts could reasonably support.

The evaluation of fourth-generation application development tools, in order to enhance programmer productivity, was then made a high priority. After in-house testing of two such generators, involving the creation of prototype systems, the company chose the Burroughs' Logic and Information Control System (Linc) as

the fourth-generation tool to assist in application development.

Hughes had done internal processing on Burroughs' equipment since 1977, when its home office facilities were located in Long Beach, Calif. Hughes moved those facilities and its data processing to Houston in April 1983. Hughes currently has installed two Burroughs B6810 systems operating in a loosely coupled environment with 7.5M bytes of main memory. Hughes also has installed 3.9G bytes of disk storage and a network of 65 CRT and printer terminals.

Darol Jorgensen, manager of information services for Hughes, explained that after the company had

acquired Linc in October 1983, the first issue was to develop an interactive sales and billing system, which management had been considering.

Each of the company's 60 field offices was writing customer contracts. Those contracts were forwarded to the Houston location for processing. Once in Houston, the contracts were entered into a batch processing system that simply summarized a manual system used for billing.

Each contract was copied and filed for record keeping, and the original was returned to the customer in the form of an invoice. This process had become a cumbersome and inefficient way of bill processing accounts

receivable. The proposed system would fully automate these procedures into an interactive, on-line processing environment.

Since the sales and billing field offices were located in various taxing authorities in different states and countries, the correct tax had to be calculated and changed automatically on each customer invoice. The system was also required to interface interactively with the accounts receivable, general ledger and product master systems, which were already in production. To complicate the situation further, the system would have to be developed within a very short time frame to meet management goals.

The system was approved, and it was estimated that its development would require a minimum of three years. One method considered for completing the project was to subcontract three full-time experienced programmers to provide the detail coding and assign two permanent Hughes employees to the management and design control project.

Linc's pluses

This option was rejected because overall cost and development time would have exceeded requirement specifications. The Burroughs' Linc system was chosen because it offered a lower development cost, a projected completion date that was within specifications and the capability to be used in future project development.

The development effort was assigned to Ajay Rustagi, systems and programming manager for Hughes. Rustagi's responsibilities included both programmer management and system software control. The project began Oct. 1, 1983, and at that time the system's specifications had not yet been started.

By Nov. 1, Rustagi and a team of two programmers were able to complete the system's specifications and to develop a 15-screen working prototype of the system by using Linc.

This prototype was then presented to top management for final approval prior to completion of the application. After receiving full management support, the team completed the entire system and had it ready for production on Jan. 10. The system was tested the following month, and live processing began on Feb. 10.

Rustagi said that "one of the greatest impacts of the Linc system was the increased awareness and involvement of the end users in the development. This is due to the flexibility in Linc to allow changes and additions at late stages of development. This interaction allowed for a smooth implementation and training period."

At Hughes, 2,500 lines of Linc input generated over 10,000 lines of Cobol and data base source statements. "While the project was an overwhelming success," Jorgensen said, "there were some problems. It was difficult initially to get the development tool to run properly on the Hughes system. We had to call on Burroughs personnel to assist."

Future systems planned for Linc development at Hughes include accounts payable, purchase orders and personnel.

COMPUTER SHOW THE WORK COMPUTER SHOWS

Services

- Computer and hardware service and repairs
- Consultants: aerial business, professional, and corporate applications assistance
- Third party software support
- Product distribution and retailing
- New product development and marketing
- Financial services

Conference Sessions

- *Channels of Distribution for PCs and Compatibles:* Aaron Goldberg, Research Manager, International Data Corp.
- *What's Ahead in Integrated Software:* Thomas Gregory, President, Orvation Technologies.
- *Introduction to Personal Computer Communications:* Andrew Fluegelman, Editor-in-Chief, PC World Magazine.
- *Project Management Software:* Richard Watson, President, Harvard Software.
- *The PC Aftermarket - Hardware Opportunities:* Dr. Martin Alpert, President, Tecmar, Inc.
- *New Channels for Software Distribution:* Ted Leonis, Publisher, LIST Magazine.
- *Compatibility Issues for the Corporate PC User:* Harry Miller, Editor, PC World Magazine.
- *Selling to the Corporate Account:* Vince Caracido, President, Sales Techniques, Inc.

- *Integrated Software Applications for Experienced Users:* Gordon Edelman, Chairman, C&E Software, Inc.
- *Many more. See Show Guide for complete schedule.*

Free Software Clinic

Bring us your computer and applications problems, and we'll help you find the answers. Each day, from 11 a.m. to 2 p.m., software experts will conduct personal applications and selection clinics, free of charge for show attendees. We'll help you pick the packages best suited to you. And we'll help you solve the problems you may be facing with the software you now own. And it's free.

\$999.00 Software Giveaway!

Enter the PC World magazine drawing for one thousand dollars worth of the software of your choice. It's easy, and there's no obligation.

The PC World Exposition is sponsored by PC World Magazine

Take \$5.00 off the price of your ticket.

Save \$5.00 on admission to the entire show and conference programs, June 13-15, or admission to the full three days of exhibits. Just clip this coupon and hand it to the cashier. Regular price for the entire show and conference programs is \$35.00; admission for exhibits only is \$15.00. Duplicates of this coupon are not acceptable; coupon is not redeemable for cash. One coupon per person. No credit cards.

Wednesday and Thursday, 10:00 a.m.-5:00 p.m.,
and Friday 10:00 a.m.-4:30 p.m.

The PC World Exposition is produced and managed by Mike Hill Associates.
For any further information call Mike Hill Associates at 817-389-7688 or 817-389-8888.
PC World Magazine is a registered trademark of World Group Co., Inc.
* applies company's trademark. * applies company's registered trademark.



June 13-15, 1984
Donnelly Hall
at McCormick Place West
Chicago

NEWS



**TELEPHONE
SERVICE**
Pittsburgh
City Telephone Bureau

Nata attacks Centrex inquiry

WASHINGTON, D.C. — An investigation into whether pending Centrex charges

should be changed has been attacked by the North American Telecommunications Association (Nata), a trade group that represents independent suppliers of private branch exchanges and other terminal equipment connected to the dial-up telephone network.

The investigation is being conducted by a board composed of three federal and four state communications commissioners. The board is

trying to determine whether the surcharges to be levied on Centrex access lines will encourage users to replace the equipment and thus leave local telephone companies stranded with investments in central office facilities.

Nata complained earlier this month that the board has failed to ask "certain key questions." As a result, the phone companies have been given "carte blanche to... predetermine the outcome in

their favor. Such a course threatens to undermine the [Federal Communications Commission's] basic access-charge decision," Nata said.

AT&T told to set new Lata billing

WASHINGTON, D.C. — U.S. Federal District Court Judge Harold Greene has di-

rected AT&T and the former Bell operating companies to establish a new billing system for customers who use both inter-Lata (Local Access and Transport Area) and intra-Lata 800 service.

Charges currently are calculated by statistically sampling the service mix. This arrangement will continue while the new system is implemented, a process that will take several months.

Under the new system, AT&T will supply local telephone operating companies with data on a daily basis to enable them to determine actual inter- and intra-Lata 800 service usage.

AT&T asks FCC for depreciation

WASHINGTON, D.C. — AT&T has asked the Federal Communications Commission to let it use a quicker method of depreciating switches, cables and other network facilities installed before 1982.

Financial analysts suggested the move presaged an AT&T request for higher rates, because the effect would be to increase the company's costs. Such a request, they indicated, might represent an attempt by AT&T to recoup some of the revenue it lost as a result of the FCC decision earlier this month that requires AT&T to reduce its Message Toll Service and WATS rates 6.1%.

A spokesman for AT&T vigorously denied any connection between the FCC decision and his company's accelerated depreciation request. If granted, the latter would reportedly increase AT&T's depreciation expenses by \$660 million annually and add approximately 3% to its revenue requirement. According to the spokesman, this wouldn't necessarily cause the company to ask for higher rates.

**Finally,
a model-building kit
with all the instructions
right on the box.**

Introducing...
These days, you never know when you'll need the right commands...
Which is why...

Because while you're trying to figure out how to help the computer, the computer could actually be helping you.

So at Comshare we created Model-by-Example. Information that actually guides you through the model-building process.

Not in a manual. But up on the screen.

You get a framework to follow. In a language you can follow. Which means you get place-by-place instructions that everyone can follow.

To find out more about Model-by-Example, call Chris Harty at Comshare toll-free: 1-800-522-5533. Or Michigan call: 313-584-4800. Or simply visit your business card to Comshare, P.O. Box 2265, Ann Arbor, Michigan 48106. And get the one thing every model maker hopes for: Easy assembly.

SYSTEM SUPPORT SOFTWARE
COMSHARE



FAMILIAR WITH BASIC FOUR

User needs information with respect to Basic 4 Sales and O.E.M. policies. If interested, just send name and phone # to CW-84020, Computerworld, Box 880, Framingham, MA 01701.

FF: Left: Help=1 Extra=2 Zoom out=3 Toggle=4 Top: 55 Up: 57 Compress=9
Bottom: 25=10 Expand: 10

NEWS

DBMS gets aircraft development off the ground

Relational system allows departments to access interrelated information

LINKÖPING, Sweden — For engineers involved in aircraft development, constant communication and interaction between various disciplines are critical elements in the design process. Thanks to a recently implemented relational data base management system (DBMS), several departments at Saab-Scania AB's Aircraft Division here are able to access interrelated information via a networked data base. Saab's stress analysis, computer-aided design and manufacturing (CAD/CAM), aerodynamics and flight test departments, as well as its simulation center, share engineering data relevant to designing civilian and military aircraft.

Saab, an organization with worldwide operations and 40,000 employees, has three major divisions — truck, car and aircraft. The Saab Aircraft Division, with 7,000 people, is responsible for designing and manufacturing military and civilian aircraft.

In the past, according to Gunnar Hermanson, head of the coordination group, data exchange among the various departments in the aircraft division was less than ideal. Each department had its own software programs, although output from one area often became input for another department. In order for separate departments to use the same data, which was generated as tables or graphs, information had to be more or less manually converted.

"There were several problems inherent in our old system," Hermanson said. "The development process slowed down, and project costs increased because of the difficulty of transferring data. Certain engineering optimizations that required fast iteration were too time-consuming to carry out."

Datacom Project

In an effort to solve the problems, the Datacom Project was initiated. "The main point in the Datacom Project is communicating data from one department to another. We set a goal to develop utilities, methods and techniques that would considerably decrease the amount of work needed to transfer engineering data," Hermanson said. "We also wanted to provide for future expansion of data and software programs. We searched for approaches that would be easy to understand and meaningful to the user."

Hermanson said the project group considered continuing to use files to transfer data, but rejected that option in favor of a relational DBMS from Oracle Corp. of Menlo Park, Calif. However, because of speed considerations in Oracle, files would still be used for storing things such as large matrices.

"Relational DBMS are very attractive to us because they provide a lot of independence between the data and the programs. With a relational system, there is the possibility of changing data definitions without altering programs already working on the data base. The level of independence is such that you can change the programs without changing the data, or you can manipulate the data definitions without altering the programs."

"A relational DBMS is also easy to understand," he continued, "and a data structure can quickly be agreed upon when it is represented in a set of tables."

In late 1981, Saab-Scania began evaluating DBMS. After looking at three relational systems, the project group decided on the Oracle DBMS.

"We chose Oracle because it is superior in a number of conceptual areas, one of them being its architecture, which enabled us to implement a distributed work load. The hardware environment for the Datacom Project consists of three Digital

Equipment Corp. VAX-11/780s and two VAX-11/782s," Hermanson said.

"In its current configuration, the application programs and the data base may be located on separate VAXs, but since the VAX-11/780 on which the data base is located is networked (using Decnet) to all the other computers, data can be transported from machine to machine."

"As an example," Hermanson said, "suppose the CAD/CAM department generates geometric data that describes a wing or a fuselage. The data goes from that department into the data base, where both the aerody-

namics and the stress analysis departments can then access the information and incorporate it into their own calculations."

According to Hermanson, on Saab's Datacom Project, Oracle supports approximately 30 engineers who can access the data concurrently. "Altogether, a total of more than 60 engineers within the aerospace division use Oracle, and that number is growing as more programs are developed using the system."

Hermanson said other features that influenced the aerospace divi-

See DBMS page 36

Turn
the page.
We're gonna
do a number
on you.

NEWS

DBMS from page 35

alen's decision to buy Oracle includes its active data dictionary, security and transaction logging capability, high-degree logical data independence, multuser capability and its data language, SQL Plus.

SQL Plus, which is a superset of the SQL data language developed by IBM, allows users to define data with a common language. Information is displayed for Saab's engineers in a form to which they are already accustomed — two-dimensional tables.

"The tabular representation of the data in a relation makes it easy to communicate and to agree upon in the data definition process," Hermanson noted. "The links between the relations aren't hidden from the users. There is a consistent and complete set of operations to be performed on the tables, and future data manipulation is possible."

Because Oracle's SQL Plus can be used from programs written in standard programming languages, Saab's engineers are able to make use of an increasing number of existing application programs written in Fortran. Sculptured surface, stress analysis and aerodynamic models, for instance, can all communicate with the data base.

The aerodynamic model program for the JAS39 aircraft, a military airplane being developed for the Swedish Air Force, uses a model and data stored in the DBMS. Engineers can assign specific aerodynamic parameters — how fast the aircraft can turn, speed at various motor power settings and so forth — and determine how the aircraft will respond in a given situation.

An extended data dictionary facility in the Datacom Project data base, which will use an estimated 500M bytes of memory, is implemented using a number of tables that list projects to which the data belongs and that also state who is responsible for the data. Each time a data base table is added, deleted or modified, the dictionary is automatically updated, guaranteeing that the next user to access the information is using the most current data and list of tables. It also contains descriptions of the contents of tables and columns.

Hermanson said Saab recently installed a Cray Research, Inc. Cray 1 supercomputer to speed solution of

'Relational DBMS... provide a lot of independence between the data and the programs. With a relational system, there is the possibility of changing data definitions without altering programs already working on the data base. The level of independence is such that you can change the programs without changing the data.' — Gunnar Hermanson, head of Saab's coordination group.

finite element and aerodynamic problems where complex algorithms are executed on large data volumes. The Cray and the VAX containing the data base will be joined.

In addition to the Datacom Project, Hermanson mentioned other programs that use the relational DBMS.

A flight test planning application, for instance, allows Saab to control more accurately the administration of flight test activities.

Another application is used to establish the weight of aircraft in the design stages. At different stages of development, the system collects the

weights of individual parts. Looking at the weight of the various parts, engineers can quickly determine the total weight and point of gravity.

For the future, Hermanson intends to bring more data to the DBMS and to explore the possibility of using Oracle's graphics extension to present data in graphics form. A major goal is to extend the services of the DBMS while constantly enhancing the convenience of the system for its users.

To date, however, the Oracle approach has produced significant gains in both time and money. "Because it is easy to agree on a data structure between different departments, and because of the system's high degree of independence, ongoing new software developments will be accomplished much faster," Hermanson concluded.

THIS YEAR AT NCC,
DSD WILL ADD
A NEW TWIST TO
DEC-COMPATIBLE
STORAGE

DATA SYSTEMS DESIGN

BOOTH H518

NEWS

Joint venture takes hard look at bank productivity

Project used to develop means of measuring productivity for interbank comparison

DETROIT — Productivity, the buzzword of the 1980s for many American businessmen, was the subject of a serious joint research venture between the Bank Administration Institute of Rolling Meadows, Ill., and the American Productivity Center of Houston in 1983.

The goal of the project was to develop a means of measuring bank productivity for meaningful interbank comparison. The result was a theory and a methodology using a macro approach to measure productivity by product lines throughout a financial institution (as opposed to

traditional function-in-proportion-to-time measures).

The creation of this theory and methodology brought with it the challenge to develop a practical, realistic system for implementation in the banking community. Not only would new data have to be identified and developed, but *ad hoc* query, extensive reporting and easy data base maintenance capabilities would also be required.

Five financial institutions volunteered to participate in the project to develop an application for implementing the productivity methodology.

Limited by time restrictions and adherence to the methodologies identified in the study, each institution was allowed to develop its own version of the application the way it felt best met the needs of the project.

As a result of this project, Manufacturers National Bank of Detroit set a high standard of productivity of its own in its design and implementation of the new productivity methodology system. In January 1984, the bank, ahead of schedule, tested its first set of analysis reports. The system was developed using Ransie II, a fourth-generation language and data

base management system produced by Mathematics, Inc. of Princeton, N.J.

"Fourth-generation language was definitely the way to go," said Martin Metzner, operations officer and manager of productivity at the bank.

Data for the Total Bank Productivity Measurement System was gathered and entered by non-data-processing personnel using the menu-driven panel component of the basic Ransie II system. Actual programming for the application was completed in 120 workdays over a four-month period by the bank programming staff and members of a Mathematics consulting team.

Almost exclusively on-line, the application produces 10 standard monthly reports plus a quarterly analysis and summary from Ransie II and IMS files on the bank's IBM 3083 running under TSO. "End users can access information and prepare their own simple reports after a two-hour demonstration," Metzner added. More than 30 services (such as wire transfers, commercial loans and letters of credit) are covered by the application, and all output produced by the bank is measured against all bank input resources expended.

The application was developed in two phases, according to Dave Rayford, second vice-president and systems officer. In the first phase, a 30-page working document (outlining file design, calculations, a user manual and system components) was created during the initial three weeks of the project by the bank's systems and productivity staff, along with a member of the Mathematics consulting staff. The second phase implemented the application design.

Ransie II was essential for prototyping the application, Metzner said. "We knew how the application would look long before it was even programmed." In addition, the project's early completion was largely due to expanding the prototype into the full-fledged Total Bank Productivity Measurement System.

The Total Bank Productivity Measurement application gives a global view of data, using two Ransie II data bases containing 15 permanent files. Updates of the data in these data bases is conducted by end users. "The system also taps into existing personnel, payroll, general ledger and other automated systems," Rayford said.

"We can have the information we want any time and any way we want to cut it. We are able to monitor the productivity of the entire bank and compare our productivity with other participating financial institutions," Metzner concluded.

Introducing the III and only.

It's fast.
It's easy.
It's the most powerful database management system for your 16-bit PC.

And it can do more things with more records in less time.

You've never seen anything like it. dBASE III™ can handle over a billion records per file, limited only by your computer system. You can have up to 100 million files for sophisticated applications programs.

When you have two related files, information in one can be accessed based upon data in the other.

dBASE III now handles procedures, parameter passing and automatic variables. You can include up to 32 procedures in a single file. With lightning speed. Because once a file is opened, it stays open. And procedures are accessed directly.

Easier than ever.

dBASE III uses powerful yet simple commands that are the next best thing to speaking English.

If you're unsure of a command, HELP will tell you what to ask for.

If you don't know what command comes next, a command assistant does. All you have to know is what you want it to do.

Our new tutorial/manual will have you entering and viewing data in minutes rather than reading for hours.

And to make matters easier, you get full screen report set-up for simple information access.

Faster than no time at all.

dBASE III isn't just fast.

It's ultra-fast. Operating.

And sorting. Even faster.

is no sorting. Because dBASE III keeps your records in order so you really don't have to sort anything. Unless you want to. Then watch out!

What about dBASE II?

It's still the world's best database management system for 8-bit computers. And it's still the industry standard for accounting, educational, scientific, financial, business and personal applications.

Let us do a number on you.

For the name of your nearest authorized dBASE III dealer, contact Ashton-Tate, 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 333. In Colorado, (303) 799-4900.

ASHTON-TATE ■■■™

dBASE III available in Java, dBASE III and Ashton-Tate are trademarks and dBASE II is a registered trademark of Ashton-Tate. ©Ashton-Tate 1984. All rights reserved.



... And for the high-tech person, we have this lovely PC on a rope.

Systems development tools cut applications backlog

SHAUMBURG, Ill. — Zurich-American Insurance Co., based here, is part of an international group that is among the top five insurance companies in the world. The firm has begun to cut its applications backlog back to the point at which it began, according to Howard Feinstein, senior vice-president of corporate processing services.

"On one recent development effort, automated general ledger," Feinstein said, "we've found that by using the SDM/70 methodology, the level of maintenance and enhancements, which contributes to the backlog, is much smaller than previously anticipated."

The SDM/70 methodology is part of a family of systems development and maintenance methodologies offered by AGS Management Systems, Inc. of King of Prussia, Pa.

"On the employee travel advance system, an accounting system," said Patricia O'Shea, methodology coordinator at Zurich-American, "we've had no enhancements or user changes for the seven months since it was installed."

"When I was writing up the post-implementation review," O'Shea continued, "I found that users actually were able to participate on the project team and did the same tasks as team members during the first two

SDM/70 phases, especially the systems requirements definition. What this meant was that the users got the system they needed. The absence of enhancements or changes is a record. It's saving our company money, because rework adds to our backlog and means additional expense."

To cut down further on service requests that unnecessarily add to the backlog, Zurich-American is requiring project valuation assessments for all such requests.

Project valuation

"A project valuation assessment," explained Tim Spitt, assistant manager of quality assurance at Zurich-

American, "pursues each service request to be assessed in terms of its relationship to corporate goals, tangible and intangible benefits, risk considerations, costs and responsibilities. We're using the SDM/70 project administration guidelines as the basis for this. We expect that by requiring project valuation assessments, only the systems that are most important to the company will be worked on."

Zurich-American is also performing post-implementation reviews to analyze the benefits and cost data of existing systems, to determine system effectiveness and to identify improvement opportunities. This will enable it to group enhancements for each system into one umbrella service request, which can then be handled as a planned release. Although this may not reduce the backlog, it will enable Zurich-American to manage each work properly and, therefore, reduce costs.

To manage the backlog, as well as current development, Zurich-American uses the PAC II project management system offered by AGS.

"What the combination of these two systems has provided for us," Feinstein said, "is a reporting technique and the ability, from a business point of view, to direct our resources effectively. We can now account for the time spent by all of our resources and can allocate them according to business objectives. The information generated by PAC II is used in my reviews with corporate management to determine how we can best direct our efforts to benefit the company."

SDM/70 and PAC II were acquired in 1981. Prior to that, there was no methodology, no standard approach to projects, and the project control system it had was more of an accounting and timekeeping system.

"Originally, time-reporting was spotty at best," explained Deborah Keyes, project control administrator at Zurich-American. "We now have between 90% to 95% of our resources reporting data to PAC II. Planning is where SDM/70 comes in. We're using the SDM/70 tasks with their estimating guidelines to build our development plans. Use of SDM/70 is still optional, but we've found it significant that when those who are planning projects don't use the standard SDM/70 tasks, we can't audit their work easily."

To manage all of the work in the queue, four systems development and enhancement life cycles have been defined, based upon SDM/70, according to O'Shea.

"These include efforts less than 30 days, from 30 to 70 days, from 70 to 100 days and any effort over 100 days. For each, we've defined who is responsible for performing the work, the level of user approval, at what level PAC II tracking is required (that is, milestone vs. activity), what level of SDM/70 task is required and if the methodology coordinator should function as an in-house consultant."

"We're now presenting quarterly resource utilization reporting for senior corporate management to show how our resources are being utilized," Spitt said, "and to show what backlog exists and to determine how resources should be shifted to accomplish corporate goals."

It took us five years to develop the best
DOS VS(E) disk tape manager.

it will take you
ten minutes
to prove it.



NEWS



**INTERNATIONAL
IMPORT
CORPORATION**
New York, N.Y.

AUSTRALIA

SYDNEY — The Melbourne and Sydney stock exchanges have, through their wholly owned subsidiary, acquired two Tandem Computers, Inc. TXP Nonstop processors. The subsidiary said it chose the TXPs because of the "potential volatility of stock market processing," echoing the American, New York and London stock exchanges in their selection of the redundant processors.

CHINA

BEIJING — Control Data Corp. has signed a long-term joint research and development contract with China's Administration of Computer Industry. CDC will cooperate with the administration in technical interchange, planning, manufacturing and sales of DP products in China as well as with service and the training of personnel. According to CDC, the first priority under the agreement is to transfer the technology of CDC's Winchester disk drives to the administration.

BEIJING — Hewlett-Packard Co.

signed an agreement in principle with the China Electronics Import and Export Corp. to establish a joint venture company to manufacture and distribute HP products in China. If the pact is finalized, the new company will be called China-Hewlett-Packard-Ltd.

BEIJING — Computerland Corp. has penned a letter of intent with the Chinese Ministry of the Electronics Industry for a joint venture to sell microcomputers in China. Retail outlets, called Computerland China, would be established in China under the terms of the agreement. Headquartered in Oakland, Calif., Computerland currently operates some 660 stores in 26 countries.

FRANCE

PARIS — During the Special Salon International de l'Informatique de la Communication et de l'Organisation du Bureau conference held here recently, the British company Rair, Ltd. unveiled what it calls the first supermicrocomputer based on Intel Corp.'s IAPX 86 microcomputer. Designed for multineer applications (nine to 12 users), the Rair Supermicro is said to be two times as powerful as Motorola, Inc. 68000-based systems and 60% more powerful than Digital Equipment Corp.'s VAX-11/780 supermini. The system operates under Digital Research, Inc.'s Con-

current CP/M 3.1; a Microsoft, Inc. Xenix version is reportedly in the works. A typical configuration costs \$12,500.

JAPAN

TOKYO — Japanese microcomputer shipments exceeded 1 million last year — a 50% jump from the previous year's total, according to a recent study from the Japanese Electronic Industry Development Association. Presently, 8-bit computers enjoy an 82% share of the market, while 16-bit systems hold the remaining 18%, although these products are expected to gain at least 40% of the market by 1987.

TOKYO — Brave International has unveiled a Japanese-to-English automatic translation turnkey system. The 16-bit Brains Peit 11/73 is based on Digital Equipment Corp.'s PDP-11/73 minicomputer and is available in two versions, both featuring 40,000 words.

NETHERLANDS

AMSTERDAM — Olivetti Corp. will open 10 of its "Olivetti Shop" computer franchises here this year, a Dutch Olivetti spokesman said.

AMSTERDAM — British Telecom International, the German Bundespost and the Postal, Telephone and Telegraph (PTT) administrations of Belgium and the Netherlands will

jointly develop the first fiber-optic cable between England and the Belgium coast. The project, slated to be completed in 1985, will consist of three monomode fibers, each able to handle 280 millions of instructions per second, according to a spokesman.

AMSTERDAM — Dutch and Belgian software experts formerly employed by Control Data Corp. have founded a company called Gist Database Systems Corp., with offices in Holland, Belgium and the U.S. One of the founders is Gerard M. Nijssen, known for his Nijssen Information Analysis Methodology.

WEST GERMANY

MUNICH — Bernhard Bauer, business director at Amahl Deutschland GmbH, quit the company after 1½ years of service reportedly due to "insurmountable differences" with Amahl's European management team in London. Bauer's predecessor, Dieter Knoppe, left Amahl for the same reason in 1981. Both men joined the Hamburg, W. Germany-based computer leasing company IOC after leaving Amahl.

MUNICH — Micropro International Corp. has shut down its European headquarters here. Insiders blamed the closing on Micropro's lagging business in the U.S., a recently established subsidiary in Japan and a general need to reduce management staff.

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 5421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45408 U.S.A. • (513) 435-5455

Telex 214-609-0089

New York 201-525-9416

Registered Trademark

DATASOUTH IS 1250 LOW COST HIGH PERFORMANCE FOR YOUR DEC/Intel II

With the DS1250 Terminal Controller, your DEC/Intel II's LA36 performs like a DEC/Intel II, at only a fraction of the cost. In minutes, you can replace your LA36 logic board with a DS1250 and get all these high performance features:

- 145 CFS BIDIIRECTIONAL PRINTING
- HORIZONTAL AND VERTICAL TABS
- PAGE LENGTH SELECTION
- 110-4800 BAUD OPERATION
- 1000 CHARACTER BUFFER
- X-ON, X-OFF PROTOCOL
- SELF TEST
- LSI MICROPROCESSOR ELECTRONICS
- RS232 INTERFACE
- 30 MA MICROBIT LOOP INTERFACE
- TOP OF FORM
- ADJUSTABLE MARGINS
- DOUBLE WIDE CHARACTERS
- PARITY SELECTION
- OPTIONAL ASCII CHARACTER SET
- STRICT QUALITY CONTROL

More than 10,000 LA36s are already using DS1250 Terminal Controllers to perform like south.

DATA SOUTH COMPUTER CORPORATION
PO Box 149497, Charlotte, N.C. 28214
704/373-8520 Telex 9843016 DASSOU UN

HIGH PERFORMANCE MATRIX PRINTERS

What we is a failure to c



have here communicate.

Word processors can't always communicate with other word processors.

Internal mail networks can't often communicate with other outside networks.

Apples can't communicate with oranges.

People can't always communicate with people.

The advanced technology that was designed to enhance communication is sometimes leaving its users wondering if it might be better to go back to the Pony Express and carrier pigeons.

The answer? The QUIK-COMM™ System, a global electronic mailbox service.

QUIK-COMM is a worldwide communications integration system. So you can make your business information as multi-national as you are.

It's the largest, most advanced and comprehensive worldwide business communication system, with a continually expanding array of enhancements. And the system allows utilization of your existing equipment.

No other system can match what we offer in network, application capability and worldwide coverage. And no other system has the name General Electric on it. Which says a good deal about things like quality, reliability, service support and commitment.

We'll work together to define your needs, and develop the best solution for you. Call 800-638-9636, ext. 2001 or contact us by electronic mail*.

GE Information Services Company #CWI-638-6
Manager of Client Services, 401 North Washington Street
Rockville, Maryland 20850

Name _____ Title _____
Company _____
Street _____
City _____ State _____ Zip _____
Tel. no. _____ Telex _____



**INFORMATION
SERVICES**

General Electric Information Services Company, U.S.A.

*You can use any ASCII terminal. In the U.S. call 800-638-9636. Listen for the computer tone and insert the telephone into the reader. Press the "1" key several times. Use the carriage return key. The system will then request that you enter a mail number. Enter RPN@MAIL. The system will then prompt you.

PROTOCOL CONVERSION

With Innovative's MC-80 Protocol Converter Series, you don't just get low cost solutions to your network compatibility problems, you get much more.

- Total technical support
- On and off line diagnostics
- Dial-up capability
- Direct or Remote Communications
- Network compatibility

Call us today, toll free, for more information on our NEW and existing Protocol Converter Series.

NEW

- IBM 3270 SNA/BSC to (4-32) ASCII Devices
- IBM 3287/88 Type A COAX to ASCII Printers
- IBM 3270 SNA to NCR Poll Select
- IBM 5251/5256 Emulation for IBM 34/36/38
- IBM 2780/3780 BSC to ASCII Devices
- IBM 3270 BSC to ASCII Devices/Host
- IBM 3270 BSC to Burroughs/NCR Poll Select
- Burroughs Poll Select to ASCII Devices

Innovative

(800) 821-5340
1-800-327-3888

INNOVATIVE ELECTRONICS, INC. 4714 N.W. 185th St., Miami, FL 33141

NEWS

On-line report generator makes hands-on users of school's staff

CINCINNATI — An on-line report writer package is making a growing number of administrative and staff workers "hands-on" users of the University of Cincinnati's data processing center here.

The university's information center, which was established in 1980, is currently serving more than 100 users. Two programmers and a systems analyst from the school's computing center, which operates an IBM 3083 and an Amdahl Corp. 470V/7 under IBM's OS/VS, have been assigned to develop the information center and train its users.

According to Paula Miller, one of the programmers assigned to the application support/information center area, most information center users are from the university's finance, editing, payroll and personnel departments. In addition, the center is utilized by a hospital and a blood bank associated with the university. Users are typically middle-management level personnel, including an assistant director in charge of payroll, an internal auditor and a nursing station manager.

In order to provide users with a tool for on-demand report generation, the information center staff recently installed Informatics General Corp.'s Answer/DB on-line report writer package. Running under the school's on-line IBM CICS teleprocessing monitor, Answer/DB provides interactive editing and syntax-checking capabilities and gives users a simplified language with which they can design their own reports, Miller said.

Miller said new users are given a training session that first familiarizes them with the computer terminal and the keyboard. The information center staff then instructs users in the basic concepts of utilizing Answer/DB — for example, how to create, save and submit a report, how to list the library and how to make changes to an existing report program. Finally, users learn how to access a file and actually select the records with which to build a report.

After undergoing two half-day training sessions, Miller said, most users are able to log on to the computing center's mainframes and create and run their own reports. "One of the features that is most valuable to us is Answer/DB's error-checking ability. It automatically checks for any 'type three' errors, those which would terminate a job, and it issues an error message. Users don't have to go through a complete run to find out that they have caused an error by misspelling a name."

Use of classrooms

Miller said a typical reporting program developed by the school's end users is one which helps the registrar's office schedule the use of classrooms.

Written by a member of the registrar's staff, the program generates reports indicating which classroom is being used for what subject at any time so classroom space can be more effectively utilized.

The finance department in one of the hospitals associated with the university uses another program developed under Answer/DB to produce reports that show, on a department-by-department basis, to which cost center an employee's time should be charged. That program also keeps track of employee vacation and sick time, as well as overtime, according to Miller.

"While Answer/DB is used primarily as an information center tool at [the university], staff programmers in the computing center also find it useful," Miller said. "For example, they will often use Answer/DB to test out a new file, to locate errors and to ensure that they have good record information."

UNINET

**JUST TO PROVE
WE GIVE YOU
SERVICE ANY
TIME YOU NEED
IT, CALL THIS
NUMBER AT 3 A.M.
TOMORROW.**

Having a toll-free number may not be unique, but having a service specialist there to answer it 24 hours a day certainly is.

You can call us with any question or any problem, at any time.

We believe that service, both before and after you select an information network, is the key difference between UNINET and every other data communications network.

As all of our major sites you'll find a UNINET Systems Engineer on hand to personally implement your network services.

You'll have on-going technical support from people who have first hand knowledge of your particular equipment and communications needs.

And you'll always have a toll-free number available for immediate assistance.

We're UNINET. The information network that never sleeps. Find out more about the nation's third largest value-added network. Call us toll-free at 1-800-821-5340.

*The best kept secret
in value-added networks.*

UNINET, Inc.

10000 Valley View Drive, Lenexa, KS 66219



1-800-821-5340

business problems or opportunities you face.
Whichever of our people you need.
Account Executives assigned to some
businesses. Or Account Reps to help others over
the phone. Or operators to help set up a telecon-
ference or collect calls.
Specially trained people you get with AT&T, to
help your business work better.



NEWS

Remote network drives BMW's data management

System oversees global financial, operating functions

MUNICH — In the '70s, it became obvious that if Bavarian Motor Works AG was to continue its pattern of efficient growth, a business information management system would be needed to oversee both financial and operating functions.

The company already had channels of information linking the various subsidiaries in the firm, but the growth of BMW was generating an increasing volume of data, making efficient management more difficult, according to Gebhart Thattner, head of the Management Methods Department at BMW.

BMW subsidiaries reported to the parent company on an irregular and informal basis, and although both the parent company and the subsidiaries were equipped with data processing centers, BMW needed a flexible system capable of providing a global financial picture and reliable data communications. By relying on General Electric Information Services Co.'s (Geisec) worldwide remote computing network, BMW was able to solve its information management problems.

Financial reporting system

Priority was given to evolving a financial reporting system that BMW could utilize to make business and financial decisions on a daily basis. In the course of development, it was decided that this type of management information should be complemented by a planning system that could project results, budgets and monthly sales forecasts, provide current trading results, forecast liquid assets, consolidate data and compile detailed analytical reports, Thattner said.

The system is also used for management reporting on nonfinancial data, such as sales and marketing forecasts, as well as financial consolidation data.

"Within a few seconds we can establish the sales situation of our eight main subsidiaries, accounting for 80% of our exports, and this enables us to arrive at the right decisions about our management policy and our products," Thattner said.

The BMW management information system is integrated and designed to fit users' needs. Each new system module is supported by those that have preceded it, and general standards are applicable to all modules. In addition, all planning activities are carried out according to a clearly defined and standardized pattern.

This standardization means that everyone speaks the same language. It also means that the data input at various terminals is in a consistent format. Input grids displayed on the screen used by the subsidiaries are in the local language, and the same is true of the reports compiled by each of the subsidiaries to meet their specific needs.



Because the entire system operates on the Geisec teleprocessing network, no BMW hardware is required except for data entry terminals. Data input procedures have been established at BMW, and security measures ensure that procedures are followed. One result of all this is that certain programs and/or data can be accessed only by BMW headquarters. On the other hand, some data is accessible to everyone, although it can be changed or updated only by specified persons. The subsidiaries are responsible for the management of their own data.

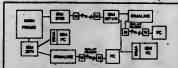
To meet the needs of the users, a marketing system was required to provide significant data about BMW's current position in the local market. This information is used by the parent and the subsidiary companies as the basis for marketing decisions. The system also must supply data in the most convenient possible form, make this information accessible as quickly as possible and minimize the manual interventions involved in processing the data.

"We have found that the management information system has a number of distinct advantages. First, the

quality of the data is consistently high, and the error rate is quite low. In addition, the data can be made available to all subsidiary locations. The system also allows for considerable flexibility. A large number of hypotheses can be simulated and allowances can be made for a variety of major external influences. The management and financial decision-making data is also available on a timely basis. Believed of the drudgery inherent in the planning process, executives can turn their attention to the creative side of management," Thattner said.

Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from DCA, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.

IRMA is the Decision Support Interface that gets IBM Personal Computers and IBM PC XT's into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.



IRMA, DCA, and Decision Support Interface are trademarks of Digital Communications Associates, Inc.

IRMA and IBM 3270

IRMA is the Decision Support Interface that gets IBM Personal Computers and IBM PC XT's into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.



NEWS

Relational tool helps B&H maintain growing data base

CHICAGO — Bell & Howell (B&H), one of the oldest and largest firms in the northern suburbs of Chicago, is highly diversified, with business ranging from audiovisual equipment manufacturing to technical education. Traditionally, B&H has relied heavily on packaged computer systems for its application requirements.

As the MIS function evolved at B&H, however, it became apparent that internally developed applications could, in many instances, better address the unique requirements of many of the company's divisions. B&H also began to plan the implementation of an information center

that would allow users to access mainframe data.

With these two goals in mind, a team led by L. E. Hoese, manager of applications technical support in the B&H corporate MIS group, began to evaluate available data base tools along with fourth-generation languages. "We realized that in an information center environment, we would be experiencing a great deal of change," Hoese said. "We anticipate that often a user will define a system and a program will be written, only to find that the business requirements have changed and enhancements are needed. What we wanted was a system that could be main-

tained by only a few people; that seemed to push us automatically toward a relational data base."

In March 1983, after several months of extensive systems evaluation, B&H purchased Applied Data Research, Inc.'s (ADR) Ideal, Datacom/DB, Datedictionary, Dataquery and Datareporter. Although Ideal was still in beta testing, B&H decided to purchase it based on the strength and integration of the other software components, its experience with ADR's Rescoe and The Librarian as well as ADR's reputation. B&H felt that an important strength of Datacom/DB was the multiliner facility, which allows batch, on-line and mul-

tiple on-line access concurrently.

While awaiting the formal release of Ideal, B&H installed the other ADR products. Although Shelley Ochs, manager of decision support systems, did not have formal training in programming, she worked with Dataquery and Datareporter concurrently. "I have a data base with two files of about 60,000 records each," she said, "and two more files with 4,000 to 5,000 records. I have written reports in both Datareporter and Dataquery that link the four files together to produce the needed information."

Once Ideal was installed in September 1983, several MIS staff members attended training classes conducted on-site at B&H by ADR. Mike Stryk, manager of data base support, believes that the 3½ day session was sufficient to educate people with simple program development goals. "Due to the complex nature of the work I wanted to do in Ideal, it has taken me about two months as the learning curve," he said. As Stryk pointed out, the more he worked with Ideal, the quicker the development cycle became. He said he is now at the point where he can work on several programs simultaneously and put up a file "in a matter of a few days."

Additional goals

Stryk has ambitious goals. "I have written about a dozen programs in Ideal. My goal is to write systems that are easy to use, that maintain data efficiently and that are user-friendly," he explained. "I want the system to function such that a person can sit at a terminal and bring up a menu that identifies the applications he is allowed to utilize. I want scrolling capabilities, an index of what is in one file or an index of whatever information the user wants to access and the ability to look at as item in more detail by selecting it from the index. That is what I wanted, and that is what I got with Ideal and Datacom/DB."

An experienced MIS user, Stryk said he saw some advantages in a relational data base. "The support necessary with Datacom/DB is minimal," he noted.

Ochs also attended the Ideal course and has been working on information center applications with corporate management. In addition to providing users with access to existing data from the mainframe, she is developing on-line data entry screens and programs in Ideal to be used for loading and maintaining new data bases. Once one of Ochs's users has set up a new data base, he can use Dataquery and Datareporter to produce reports utilizing this information.

Tom Darvenay, a systems analyst, uses Ideal's point development facility. "In Ideal, you can develop a program and do a facsimile to see exactly how it will look," he explained.

Ochs summed up B&H's expectations. "Because the end users will be able to do many of their routine reporting requests themselves, Ideal will increase productivity in both the user and the MIS departments. It will encourage managers to ask more questions about information and to spend more time involved rather than gathering data, leading to better decisions than in the past."

IRMAFINE does the same for remote IBM PCs, IBM PC XT's, Apple Lisas and DEC Rainbows, among others, with just a local phone call to a nearby 3270 controller.

Both can go to work literally minutes out of the box. Both provide mainframe data access, selection and storage, and data communication back to the mainframe.

Put first things first. Find out more about the DCA first family of 3270 micro/mainframe connections. For information, write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261375 DCA ATL. Or call us toll-free (800) 241-IRMA.

dca
Digital Communications Associates Inc.

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple and Lisa are trademarks of Apple Computer, Inc. Rainbow is a trademark of Digital Equipment Corporation.

IBM

NEWS

Productivity aid insures firm against JCL errors

LONG GROVE, Ill. — Steve Fowler, a development center analyst at the Kemper Group, used to spend sleepless nights worrying about his production jobs running at the office. This worry is one he shared with many others in his chosen profession.

Things are different for

Fowler and other Kemper programmers these days. The company is using JCLcheck, a programmer productivity aid from Triangle Software Co. of San Jose, Calif. Fowler calls JCLcheck his security blanket.

The Kemper Group, which has its headquarters here, is the 13th largest of the sever-

al thousand property casualty insurance companies in the U.S. Its data processing department supports 8,000 employees.

The firm's central computer system includes one 24M-byte IBM 3081, one 32M-byte IBM 3081, one 16M-byte IBM 3083 and one 24M-byte IBM 3083. The operating system

is MVS/XA, with a TSO system that supports 378,000 transactions per day. In addition to 470 terminals within the home office, Kemper headquarters supports an additional 540 remote terminals nationwide. According to Fowler, "During 1983, we ran more than a million tests and 250,000 production jobs.

Before JCLcheck, we had no way of intercepting potential test and production failures due to JCL errors."

Fowler chairs a development aids committee that was created recently for Kemper's 400-person DP department. "This committee facilitates the technical exchange of ideas between the application development personnel and the technical units," he said. "At these meetings, programmers expressed frustration over the time it took to pinpoint JCL errors and the wasted hours spent rerunning jobs that failed because of undetected JCL errors."

"What emerged was a search to locate a solution to this frustration," Fowler reported.

The search led Kemper to JCLcheck, a system utility package that provides syntactical and logical validation of a JCL stream before it is submitted to the system for a test or production run.

According to Fowler, "Our alternatives were two. We could write a system in-house, which would have required several technicians and potentially years of coding, plus the dedicated machine time and resources. The second alternative was to do nothing at all, which would have become the more expensive alternative."

Power users

"Even though the use of JCLcheck is strictly voluntary today, the number of errors has decreased 35% since its installation," Fowler commented.

"Our programmers who now work with JCLcheck have found it very easy to use," Fowler said. "It basically takes only two minutes to learn how to invoke JCLcheck."

"Some Kemper programs change constantly, while others are revised only every year or so," he said. "JCLcheck provides nine documentation reports, including data set and program cross-reference listings. Our technicians find the job stream documentation helpful."

"Our project teams, meanwhile, find the summary report cross-reference for multi-job production systems valuable because they can determine how one job affects another."

"Above all, JCLcheck has become our security blanket," Fowler said. "Like most other large DP operations, we run our production jobs at night. Before JCLcheck, when I'd go home, I'd have this slightly nagging worry about whether I'd come back the next morning to find my job hadn't run. Now, I don't have to worry."

KEY TRONIC Refines The Televideo-925® Keyboard

key tronic

NEWS

CALENDAR

WEEK OF JULY 1

JULY 2-3, BOSTON — The Relational Data Base Conference: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held July 12-13 in Chicago, July 19-20 in Minneapolis and July 26-27 in Rochester, N.Y.

JULY 5-6, SAN FRANCISCO — Managing Projects in the Structured Environment. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 5-6, NEW YORK — CHS Performance Design. Contact: Syed, One Park Ave., New York, N.Y. 10014.

JULY 5-6, CHICAGO — Systematic Software Testing. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 5-6, NEW YORK — EMS Recovery and Restart. Contact: Syed, One Park Ave., New York, N.Y. 10014.

WEEK OF JULY 8

JULY 9-10, SAN FRANCISCO — Introduction to Teleconferencing Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 9-10, BALTIMORE — Supporting and Maintaining the Data Communications Network. Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110. Also being held July 16-17 in Danvers, Mass., July 23-24 in San Diego and July 26-27 in Detroit.

JULY 9-11, CHICAGO — Data Communications I — Basic Concepts. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 9-12, LAS VEGAS — The 1984 National Computer Conference. Contact: Trudi Riley, American Federation of Information Processing Societies, Inc., 1890 Preston White Drive, Boston, Va. 22091.

JULY 9-13, SUNNYVALE, CALIF. — Workload Analysis and Forecasting. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JULY 9-13, DALLAS — Software Development Performance Conference. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JULY 9-13, NEW YORK — Advanced Structured Analysis. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 9-13, WASHINGTON, D.C. — Project Time

and Control Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 9-13, ATLANTA — Structured Analysis and Design Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 9-13, CHICAGO — Structured Analysis and System Specification Workshop. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 9-13, NEW YORK — EMS Data Base Design. Contact: Syed, One Park Ave., New York, N.Y. 10014.

JULY 10-12, NEW YORK — Introduction to Telecommunications. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 10-12, WASHINGTON, D.C. — Hands-On Unix Workshop. Contact: Ruth Durdick, Integrated Computer Systems, P.O. Box 45404, 6306 Arizona Park, Los Angeles, Calif. 90045.

Also being held July 24-27 in San Diego.

JULY 11-12, SAN FRANCISCO — Local-Area Networks. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 11-13, HASBROUCK HEIGHTS, N.J. — Data Communications. Contact: Center for Advanced Professional Education, Suite 110, 1680 E. Garry St., Santa

Ana, Calif. 92705. Also being held July 18-20 in Boston and July 25-27 in Houston.

JULY 11-13, NEW YORK — Artificial Intelligence. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 11-13, BOSTON — Structured Analysis for Users. Contact: Youdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 11-14, DALLAS — The 59th Annual National Office Machine Dealers Association (NOMDA) Convention and Trade Show. Contact: Nomda, 810 Lively Blvd., Wood Dale, Ill. 60191.

JULY 12-13, LAS VEGAS — IBM's Future: The Next 10 Years. Contact: Gerner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06940.

WEEK OF JULY 15

JULY 15-18, CHICAGO — The 1984 International SPSS Software Users Exchange (Sumex) National Conference. Contact: Isum, Inc., Suite 1970, 444 N. Michigan Ave., Chicago, Ill. 60611.

JULY 15-18, HARTFORD, CONN. — The 1984 Summer Conference and Exposition of Hardware, Supplies and Services. Contact: Recognition Technologies Users Association, P.O. Box 2014, Manchester Center, Vt. 05255.

JULY 16-17, BOSTON — Software Requirements Analysis. Contact: The Edu-

cation Foundation of the Data Processing Management Association Seminars, Department SRA, P.O. Box 3508, 5430 Kashira St., Torrance, Calif. 90510.

JULY 16-17, BOSTON — Supporting and Maintaining the Data Communications Network. Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110. Also being held July 23-24 in San Diego and

July 26-27 in Detroit.

JULY 16-18, NEW YORK — Job Control Language. Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 16-18, WASHINGTON, D.C. — Creating Effective Computer-Aided Instruction. Contact: Ware Associates, P.O. Box 946, Groton, Conn. 06340.

JULY 16-18, ATLANTA

See MAY page 48



NOT
ANOTHER
BLACK
BOX—

A Software Implementation within Your Product Hardware

If you manufacture a computer system or a computer based product, also it is **DALABUS.COMMUNITEC** by creating one or more of Systems Strategies "C" Language based communication packages.

- 3270 SNA-SDLC Emulation
- 3270 BSC Emulation
- 2780-2780/4050 Emulation
- X.25 Levels 1, 2, 3 Communication

You can purchase these "C" Language packages with source code and licenses to distribute in your hardware product. Each package is available either "Port it Yourself" with instruction manual and testing or ported to your hardware by Systems Strategies' communications staff.

Systems Strategies/Advanced Technology Division
Specialists in Data Communications Software



Systems Strategies, Inc.
223 West 34th Street
New York, New York 10001
(212) 279-9490

David

Recommends Texas Instruments

David Jamison Carlyle Recommends the New Generation of Printers from Texas Instruments.

Texas Instruments 850

The 850 micro printer is the first in a family of high performance matrix printers. Featuring speed (150 CPS), quality printing and graphics, plus PC compatibility, the 850 is a price performance leader with the same reliability that has made the Omni 800[®] series printers the standard in offices around the world.

Texas Instruments 707

The newest addition to the Silent 700 series, TI's 707 Portable Data Terminal uses state of the art printing and communications technology to give you all the functions needed to do business in or out of the office.

TI Printers from DJC—The Leader in Peripheral Distribution.



THE DAVID JAMISON
CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

| | |
|---------------|----------------|
| New Jersey | (201) 788-0801 |
| Illinois | (800) 236-2023 |
| Texas | (214) 786-4466 |
| Colorado | (713) 541-9611 |
| Hawaii | (808) 233-6236 |
| California: | |
| San Francisco | (415) 254-0259 |
| Los Angeles | (800) 227-2618 |
| | (213) 419-8528 |
| San Diego | (619) 421-3960 |
| Phoenix | (714) 853-5911 |
| Orlando | (305) 929-1235 |
| | (800) 221-4288 |



THE DAVID JAMISON
CARLYLE CORPORATION

NEWS

JULY

from page 47

— **Capacity Management Forum.** Contact: Institute for Software Engineering, 610 Oakmead Pkwy., Sunnyvale, Calif. 94085.

JULY 16-20, HOUSTON — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held July 16-20 in New York.

JULY 16-20, NEW YORK — **IBM DB Application Programming.** Contact: Syntex, One Park Ave., New York, N.Y. 10016.

JULY 16-20, LONG BEACH, CALIF. — **Structured Analysis for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 16-20, SUNNYVALE,

CALIF. — **MVS Systems Management.** Contact: Institute for Software Engineering, 610 Oakmead Pkwy., Sunnyvale, Calif. 94085.

JULY 16-20, LAS VEGAS — **How to Develop an Effective Long-Range Data Processing Plan.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20855.

JULY 16-20, PHILADELPHIA — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 16-20, ATLANTA — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JULY 17, PALO ALTO, CALIF. — **Strategic Information Systems for Competitive Advantage.** Contact: The High Technology Manage-

ment Group, Suite 420, 850 Boylston St., Chestnut Hill, Mass. 02167.

JULY 17-18, WASHINGTON, D.C. — **FBK vs. LAN: Selecting Your System.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held July 22-26 in San Francisco.

JULY 17-19, SEATTLE — **Microcomputer Data Base Management Systems.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JULY 17-19, MOUNT POCONO, PA. — **Focus on Data.** Contact: Du Pont Statistical Seminars, Room X-40236, Wilmington, Del. 19896.

JULY 17-20, WASHINGTON, D.C. — **Programming in C: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place,

Los Angeles, Calif. 90045. Also being held July 31-August 3 in San Diego.

JULY 17-20, WASHINGTON, D.C. — **Designing with 16-Bit Micros.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045. Also being held July 24-27 in Boston.

JULY 17-20, CHICAGO — **Vasm File Structures.** Contact: Software Information Services, Inc., P.O. Box 41322, Bellevue, Wash. 98009.

JULY 17-20, LOS ANGELES — **Computer Network Design and Protocols.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045. Also being held July 31-August 3 in Washington, D.C.

JULY 17-20, BOSTON — **Implementing Local-Area Networks.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045. Also being held July 24-27 in Washington, D.C.

JULY 17-20, WASHINGTON, D.C. — **Data Communications.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045. Also being held July 31-August 3 in San Diego.

JULY 17-20, SAN DIEGO — **Designing Real-Time Systems: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045.

JULY 17-20, SAN DIEGO — **Distributed Processing: Micro and Microcomputer Implementation.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arisana Place, Los Angeles, Calif. 90045.

JULY 17-21, CHICAGO — **The Association of Information Systems Professionals (AISP) Annual Symposium XII.** Contact: AISP Conference Services, 1015 North York Road, Willow Grove, Ill. 60090.

JULY 18-19, NEW YORK — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hialeah, Ill. 60621.

JULY 18-20, SOMERSET, N.J. — **Uniz.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92708. Also being held July 26-27 in Portland, Ore., and July 30-August 3 in Minneapolis.

JULY 19-20, CHICAGO — **Integrating Voice and Data in the FAX.** Contact: Business Communications Review, 950 York Road, Hialeah, Ill. 60621. Also being held July 30-31 in New York.

JULY 19-20, CHICAGO — **SPRS-X for Coordinators and Consultants.** Contact: SPRS, Inc., Technical Services, 444 N. Michigan Ave., Chicago, Ill. 60611.

JULY 20, CHICAGO — **Report Writing with SPRS-X.** Contact: SPRS, Inc., Technical Services, 444 N. Michigan Ave., Chicago, Ill. 60611.

WEEK OF JULY 22

JULY 23-27, CHICAGO — **Vasm.** Contact: Syntex, One Park Ave., New York, N.Y. 10016.

JULY 24-26, NEW YORK — **CICS Internals for Systems Programmers.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

UNIX IS A DINOSAUR CP/M & MS-DOS ARE TOYS

MULTI SOLUTIONS PRESENTS

THE WORLD'S FIRST 4th GENERATION OPERATING SYSTEM

A SERIOUS
OPERATING
SYSTEM

S1™

FOR TODAY
AND
TOMORROW

• PORTABLE

• MODULAR

• MULTITRUSER

• MULTITASKING

• MULTI PROCESSING

• PARALLEL PROCESSING

• 64 CHARACTER NAMES

• 3 COMMAND PROCESSORS

• REAL TIME

• DISTRIBUTED PROCESSING

• HIERARCHICAL DIRECTORIES

• LINKED FILES

• VIRTUAL

• S-tree

• RECORD

• COMPATIBLE

• WINDOWING

• MAPPED DISPLAYS

• FULL SCREEN MANAGEMENT

• FULL SCREEN EDITING

• FULL MEMORY MANAGEMENT

• VIRTUAL MEMORY

• MAPHORES & LOCKS

• EXTENSIVE UTILITIES

• AND MUCH, MUCH MORE

S1 IS THE ONLY OPERATING SYSTEM WORTHY OF THE TITLE:
"THE NEXT WORLD STANDARD."

ONLY S1 DOES IT ALL.
NO OTHER OPERATING SYSTEM
COMES CLOSE. CUTS DEVELOPMENT
TIME FROM MAN YEARS TO MAN MONTHS.

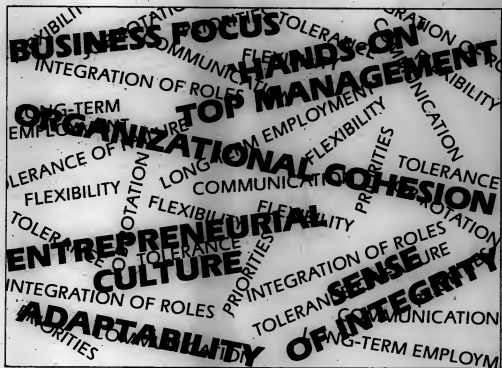
Please send for our FREE S1 Book or Call 800-896-4100

IN TIME, ONLY THE BEST WILL SURVIVE: S1



Multi Solutions, Inc.
Suite 207
123 Franklin Corner Rd.
Lawrenceville, N.J. 08846
800-896-4100 Telex: 527073

IN DEPTH



Models for management

Following the leaders

U.S. high-technology firms need not look overseas for ways to improve their management practices in order to outpace foreign competitors.

By Modesto A. Maidique
and Robert H. Hayes

Over the past 15 years, the world's perception of U.S. companies' competence in managing technology has come full circle. In 1967, Jean-Jacques Servan-Schreiber observed with alarm in his book, *The American Challenge*, that U.S. technology was far ahead of the rest of the industrialized world. This "technology gap," he argued, was continually widening because of the superior ability of Americans to organize and manage technological development.

Today, the situation is perceived to have changed drastically. The concern now is that the gap is reversing: The onslaught of Japanese and/or European challenges is threatening America's technological leadership. In *America's Technology Slip*, Dr. Simon Ramo noted the apparent inability of U.S. companies to compete technologically with their foreign counterparts. And in the best-seller *The Art of Japanese*

Reprinted from "The Art of High-Technology Management," by Modesto A. Maidique and Robert H. Hayes, *Sloan Management Review*, Vol. 25, No. 2, pp. 17-31, by permission of the publisher. Copyright © 1984 by the Sloan Management Review Association. All rights reserved.

DEUCALION IS:

A RESOURCE FOR YOUR SOFTWARE PRODUCT DEVELOPMENT NEEDS

Deucalion is a six-year old firm engaged in the development of software based products.

We have been commissioned by our Fortune 500/1000 clients to design in confidence, and at a fixed price, both the hardware and software for their new products.

If your firm needs assistance in software product development, contact:

**DEUCALION
RESOURCES GROUP**

538 North Division Street
Ann Arbor, MI 48104
(313) 668-1333

**Roger U. Giudici
President**

DRG

Attention: Prime Information Users

PI-Q4 GIVES YOU THE WORLD



Now you can travel the world of software from your Prime™ Information Environment with PI-Q4 from Computer Techniques.

PI-Q4 is a passport that opens PRIMOS™, MIDASPLUS™, PINSAM™, Fortran, Cobol, PL-1 — in fact any software system you want access to — allowing you to work in multiple environments simultaneously.

PI-Q4 is part of the QUES-IV software family used worldwide in Prime computers for 10 years. Open up the world of your Prime Information System. Call or write us.

**COMPUTER
TECHNIQUES**

Clydeport, PA 18447
(717) 486-7502
(717) 772-0010
TWX 510-471-4635

© 1984, Computer Techniques, an equal opportunity employer. Prime Computer Inc. Reg. U.S. Pat. & Tm. Off. PI-Q4 is a trade name of Computer Techniques, Clydeport, PA.

IN DEPTH/FOLLOWING THE LEADERS

The companies we studied all confronted the same dilemma: how to unleash the creativity that promotes growth and change without being fragmented by it and how to control innovation without stifling it.

Management, R. Pascale and A. Athos used as a basis of comparison two technology-based firms, Matsushita and ITT. The Japanese firm was depicted as a model for managers, while the management practices of the U.S. firm were sharply criticized.

Nevertheless, a number of U.S. companies appear to be fending off these foreign challenges. These firms are repeatedly included on lists of "America's best-managed companies." Many of them are competitors in the research- and development-intensive industries, a sector of our economy that has come under particular criticism. Ironically, some of them have even served as models for highly successful Japanese and European high-tech firms.

For example, of the 48 companies T.J. Peters and R.H. Waterman Jr. judged "excellent" in *The Search of Excellence*, almost half were classified as "high technology," or as containing a substantial high-technology component. Similarly, of the five U.S. organizations William Ouchi described as best prepared to meet the Japanese challenge, three (IBM, Hewlett-Packard Co. and Eastman Kodak Co.) were high-technology companies.

Indeed, high-technology corporations are among the most admired firms in America. In a *Fortune* study that ranked the corporate reputation of the 300 largest U.S. corporations, IBM and HP ranked first and second. And of the top 10 firms, nine compete in such high-technology fields as pharmaceuticals, precision instruments, communications, office equipment, computers, jet engines and electronics.

These studies reinforce our own findings, which have led us to conclude that U.S. high-technology firms that seek to improve their management practices to succeed against foreign competitors need not look overseas. The firms mentioned above are not unique. On the contrary, they are representative of scores of well-managed small and large U.S. technology-based firms. Moreover, the management practices they have adopted are widely applicable.

Perhaps the key to stimulating innovation in our country is not to adopt the managerial practices of the Europeans or the Japanese, but to adapt some of the policies of our own successful high-technology firms.

The study

Over the past two decades, we have been privileged to work with a host of small and large firms as participants, advisers and researchers. We and our assistants interviewed formally and informally more than 250 executives, including more than 30 chief executives, from a wide cross section of high-tech industries — biotechnology, semiconductors, computers, pharmaceuticals and aerospace.

About 100 of these executives were interviewed in 1983 as part of a large-scale study of product innova-

tion in the electronics industry [conducted by Modesto Maidique and his colleagues]. Our research has been guided by a fundamental question: What are the strategies, policies, practices and decisions that result in successful management of high-technology enterprises?

The companies we studied were of different sizes (\$10 million to \$30 billion in sales), their technologies were at different stages of maturity, their industry growth rates and product mixes were different and their managers ranged widely in age. But they all had the same unifying characteristic: a reputation for changing the technological base of their products. This rapid technological change implies novel products and functions and, thus, usually rapid growth. But even when growth is slow or moderate, the destruction of the old capital base by new technology results in the need for rapid redeployment of resources to cope with new product designs and new manufacturing processes. Thus, the two dominant characteristics of the high-technology organizations that we focused on were growth and change.

In part because of this split focus, the companies we studied often appeared to display contradictory behavior over time. Despite these differences, in important respects they were remarkably similar because they all confronted the same dilemma: how to unleash the creativity that promotes growth and change without being fragmented by it and how to control innovation without stifling it. In dealing with this concern, they tended to adopt strikingly similar managerial approaches.

When we grouped our findings into general themes of success, a significant paradox gradually emerged. Some of the behavioral patterns that these companies displayed seemed to favor promoting disorder and informality, while others would have us conclude that it was consistency, continuity, integration and order that were the keys to success. As we grappled with this apparent paradox, we came to realize that sustained success in a high-technology environment requires periodic shifts — between chaos and continuity. Our originally static framework, therefore, was gradually replaced by a dynamic framework within whose ebbs and flows lay the secrets of success.

Six themes of success

We grouped our findings into six themes: business focus, adaptability, organizational cohesion, entrepreneurial culture, sense of integrity and "hands-on" top management. No one firm exhibits excellence in every one of these categories at any one time, nor are the less successful firms totally lacking in any. Nonetheless, outstanding high-technology firms tend to score high in most of the six categories, while less successful ones usually score low in several.

1. Business focus. Even a superficial analysis of the most successful high-technology firms leads one to

IN DEPTH/FOLLOWING THE LEADERS

concludes that they are highly focused. With few exceptions, the leaders in high-technology fields realize the great bulk of their sales either from a single product line or from a closely related set of product lines.

This extraordinary concentration does not stop with the dominant product line. When the company grows and establishes a secondary product line, it is usually closely related to the first. IBM's two closely related product lines — data processing systems (approximately 80% of sales) and office equipment — both emphasize the business market.

Companies that took the opposite path have not fared well. Two of yesterday's technological leaders, ITT and RCA, have paid dearly for their strength. Today, both firms are trying to divest many of what were once highly touted acquisitions. As David Packard, chairman of the board of HP, once observed, "No company ever died from starvation, but many have died from indigestion."

A communications firm that became the world's largest conglomerate, ITT began to slip in the early 1970s after an acquisition wave orchestrated by Harold Gessen. When Gessen retired in 1977, his successors attempted to redress ITT's lackluster performance through a far-reaching divestment program. So far, 40 companies and other assets worth more than \$1 billion have been sold off — and ITT watchers believe the program is just getting started. Some analysts believe that ITT will ultimately be restructured into three groups, with the communications/electronics group and engineered products (home of ITT semiconductor) forming the core of a "new" ITT.

RCA experienced a similar fate. When RCA's architect and longtime chairman, General David Sarnoff, retired in 1968, RCA was internationally respected for its pioneering work in television, electronic components, communications and radar. But by 1980, the three chief executive officers who followed Sarnoff had turned a technological leader into a conglomerate with flat sales, declining earnings and a \$2.9 billion debt. This disappointing performance led RCA's new CEO, Thornton F. Bradshaw, to decide to return RCA to its high-technology origins. Bradshaw's strategy now is to concentrate on RCA's traditional strengths — communications and entertainment — by divesting its other businesses.

Peculiar R&D. Another policy that strengthens the focus of leading high-technology firms is concentrating R&D on one or two areas. Such a strategy enables these businesses to dominate the research, particularly the more risky, leading-edge explorations. By spending a higher proportion of their sales dollars on R&D than their competitors do, or through their sheer size (as in the case of IBM, Kodak and Xerox), such companies maintain their technological leadership.

It is not unusual for a leading firm's R&D investment to be 1% to two times the industry's average as a percent of sales (8% to 15%) and several times more than any individual competitor on an absolute basis.

Moreover, their commitment to R&D is both enduring and consistent, it is maintained through slack peri-

ods and recessions because it is believed to be in the best long-term interest of the stockholders. Ray Stata, CEO of Analog Devices, a leading linear integrated circuit manufacturer, explained in a quarterly report which noted that profits had declined 30%, "We are sharply constraining the growth of fixed expenses, but we do not feel it is in the best interest of shareholders to cut back further on product development. . . in order to relieve short-term pressure on earnings."

Similarly, when sales flattened and profit margins plummeted at Intel as a result of a recession, its management invested a record-breaking \$130 million in R&D and another \$150 million in its plant and equipment.

Consistent priorities. Still, an-

other way that a company demonstrates a strong business focus is through a set of priorities and a pattern of behavior that are continually reinforced by top management: for example, planned manufacturing improvement at Texas Instruments, Inc., customer service at IBM, the concept of the entrepreneurial product champion at 3M and the new products at HP. Belief in the competitive effectiveness of their chosen theme runs deep in each of these companies.

A business focus that is maintained over extended periods of time has fundamental consequences. By concentrating on what it does well, a company develops an intimate knowledge of its markets, competitors, technologies and employees and of the future needs and opportuni-

ties of its customers.

The Stanford Innovation Project recently completed a three-year study of 234 U.S. high-technology products (half of which were successes, half failures) and concluded that a continuous, in-depth, informal interaction with leading customers throughout the product development process was the principal factor behind successful new products. In short, this compiling is the cornerstone of effective high-technology progress. Such an interaction is greatly facilitated by the longstanding and close customer relationships that are fostered by concentrating on closely related product-market choices.

8. Adaptability. Successful firms balance a well-defined business focus with the willingness to under-

Micro-to-mainframe: Before you settle for a simplistic solution, ask a few serious questions.

Choosing a micro-to-mainframe communications system is no game. So before you try ground with "toy" solutions, ask some serious questions.

Will this product support full IBM terminal emulation? Make sure the system can emulate remote batch and interactive IBM terminal systems.

Does the company offer a variety of products?

You should have your choice of stand-alone front-end processors, IBM PC or XT boards, or on OS/2 board. All ready to run on the most popular operating systems.

Can I get fast answers to my questions?

Intel on toll-free access to qualified service personnel before and after the sale.

What if I need a quick analysis of a problem?

Ask if the manufacturer has a Communications Test Center for product testing over public phone lines. And find out if the system has internal diagnostics.



DataTalker™

By Whitelabel, Incorporated

Whitelabel, Incorporated has been providing data communications software to major manufacturers of microcomputers and word processors since 1978. Our DataTalker software and PC boards are used by companies around the world. Now start-up manufacturers to the Fortune 1000.

Suppose something goes wrong with the unit?

The company should offer a 30 day money-back guarantee and a 12 month warranty that includes a free replacement unit.

What about future product development?

Make sure the products you're going to need soon will be available soon.

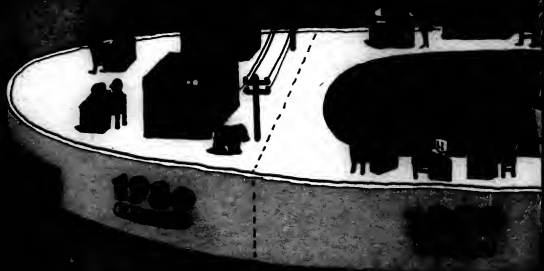
Who am I dealing with anyway?

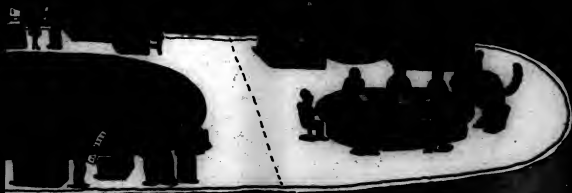
How long have they been in business? The longer, the better.

How much is all this going to cost?

Here's a point of reference: Our own DataTalker product line will give you all the capabilities and services just described for as little as \$995. Complete. If you'd like to know more, contact our Marketing Support Group at 1-800-327-7765.

Whitelabel, Incorporated
2653 Research Park Drive
P.O. Box 2763, Ann Arbor, MI 48106
313/663-3022 800-327-7765
TWX 800-223-2423
TELEX 234-276





IN DEPTH/FOLLOWING THE LEADERS

take major and rapid change when necessary. Concentration, in short, does not mean stagnation.

The cost of strategic stagnation can be great, as General Radio found out. Once the leader of the electronic instruments business, General Radio almost single-handedly created many sectors of the market, its engineering excellence and its progressive human relations policies were models for the industry. But when its founder, Melville Eastham, retired in 1950, General Radio's strategy ossified. In the next two decades, the company failed to take advantage of two major opportunities for growth that were closely related to the company's strengths: microwave instruments and minicomputers. Meanwhile, its traditional product line withered away. Now all that remains

of General Radio's once dominant instruments line, which is less than 10% of sales, is a small assembly area where a handful of technicians assemble batches of the old instruments.

It wasn't until William Thurston, in the wake of mounting losses, assumed the presidency at the end of 1972 that the company began to re-focus its engineering creativity and couple it to its new marketing strategies. Using the failure of the old policies as his mandate, Thurston deemphasized the aging product lines, focused the firm's attention on automated test equipment, balanced its traditional engineering excellence with an increased sensitivity to market needs and gave the firm a new name — Genrad. Since then, Genrad has resumed rapid

growth and has won a leadership position in the automatic test equipment market.

The Genrad story is a classic example of a firm making a strategic change because it perceived that its existing strategy was not working. But even successful high-technology firms sometimes feel the need to be rejuvenated periodically to avoid technological stagnation. In the mid-1960s, for example, IBM appeared to have little reason for major change. The company had a near monopoly in the mainframe industry, its two principal products — the 1401 at the low end of the market and the 7090 at the high end — accounted for more than two-thirds of its industry's sales. Yet in one move, the company made both product lines (as well as others) obsolete and rede-

fined the rules of competition for decades to come by simultaneously introducing six compatible models of the 360, based on proprietary hybrid integrated circuits.

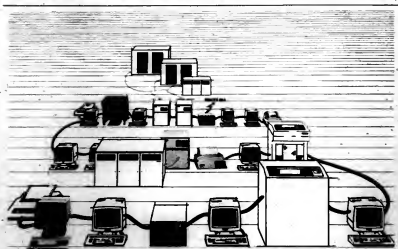
During the same period, General Motors Corp., whose dominance of the U.S. auto industry approached IBM's position in the computer mainframe industry, stoutly resisted such a rejuvenation. Instead, it became more and more centralized and inflexible. Yet GM was also once a high-technology company. In its early days when Alfred P. Sloan ran the company, engines were viewed as high-technology products. One day, Charles F. Kettering told Sloan he believed the high efficiency of the diesel engine could be engineered into a compact power plant. Sloan's response was: "Very well, we are now in the diesel engine business. You tell us how the engine should run, and I will ... capitalize the program." Two years later, Kettering achieved a major breakthrough in diesel technology. This development paved the way for a revolution in the railroad industry and led to GM's preeminence in the diesel locomotive markets.

Under-taking such wrenching shifts in direction requires both agility and daring. Organizational agility seems to be associated with organizational flexibility — frequent reassignments of people and responsibilities as the firm attempts to maintain its balance on shifting competitive sands. The daring and the willingness to take "you bet your company" kinds of risks is a product of both the inner confidence of its members and a powerful top management — one that either has effective shareholder control or the full support of its board.

8. Organizational cohesion. The key to success for a high-tech firm is not simply periodic renewal. There must also be cooperation in the translation of new ideas into new products and processes. As Ken Fisher, the architect of Prime Computer, Inc.'s extraordinary growth, put it, "If you have the driving function, the most important success factor is the ability to integrate. It's also the most difficult part of the task."

The energy and creativity of the whole organization must be tapped. Anything that restricts the flow of ideas or undermines the trust, respect and sense of a commonality of purpose among individuals is a potential danger. High-tech firms fight vigorously against the social organizational accretions of seniority, rank and functional specialization. Little attention is given to organizational charts; often they don't exist. Younger people in a rapidly evolving technological field are often as good a source of new ideas as older participants are — and sometimes even better. In some high-tech firms, in fact, the notion of a "half-life of knowledge" is used that is, the amount of time that has to elapse before half of what one knows is obsolete. In semiconductor engineering, for example, it is estimated that the half-life of a newly named Ph.D. is about seven years. Therefore, any practice that relegates younger engineers to secondary, nonpartnership roles is considered counterproductive.

Similarly, product design, marketing and manufacturing personnel must collaborate in a common cause rather than compete with one



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. Integrated Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of untapped and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 co-ax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new cabling.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support cost in any environment. Capabilities like multi-host and multi-personality support, application and address switching, and system prioritizing.

This system would have multi-user personal computing "built into" the network—allowing you to assign

true 16-bit computing power, maintain overall MIS control and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screens, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen has imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035 (408) 945-8150; TWX: 910-338-7332

*Braegen
has made
better*

BRAEGEN

IN DEPTH/FOLLOWING THE LEADERS

another, as happens in many organizations. Any policies that appear to elevate one of these functions above the others — either in prestige or in rewards — can poison the atmosphere for collaboration and cooperation.

The executive perks in many mature organizations are sources of division that distract the attention of people from the needs of the firm to their own aggrandizement. Pretentious job titles, separate dining rooms and restrooms for executives, larger and more luxurious offices (often separated in some way from the rest of the organization) and even separate or reserved places in the company parking lot all tend to establish "distance" between managers and doers and substitute artificial goals for the crucial real ones of creating successful new products and customers. The appearance of an executive dining room, in fact, is one of the clearest danger signals.

Good communication. One way to combat the development of such distance is by making top executives more visible and accessible. IBM, for instance, has an open-door policy that encourages managers at different levels of the organization to talk to department heads and vice-presidents. According to senior IBM executives, it was not unusual for a project manager to drop in and talk to Frank Cary (former IBM chairman) or John Opel (former president, now chairman) until Cary's recent retirement. Likewise, an office with transparent walls and no door, such as that of John Young, CEO at HP, encourages communication. In fact, open-style offices are common in many high-tech firms.

A regular feature of 3M Co.'s management process is the monthly technical forum where technical staff members from the firm exchange views on their projects. This emphasis on communication is not restricted to internal operations. The firm supports and often sponsors industry-wide technical conferences, sabbaticals for staff members and cooperative projects with technical universities.

Technical forums serve to compensate partially for the loss of visibility technologists usually experience when an organization becomes more complex and when production, marketing and finance staffs swell. So does the concept of the dual-career ladder that is used in most of these firms (that is, a job hierarchy through which technical personnel can attain the status, compensation and recognition that is accorded to a division general manager or a corporate vice-president). By using this strategy, companies try to retain the spirit of the early days of the industry when scientists played a dominant role, often serving as members of the board of directors.

Job rotation. A policy of conscious job rotation also facilitates a sense of community. In the small firm, everyone is involved in everyone else's job. Specialization tends to creep in as size increases and boundary lines between functions appear. If left unchecked, these boundaries can become rigid and impermeable. Rotating managers in temporary assignments across these boundaries helps keep the lines fluid and informal, however. When a new process is developed at TI, for example, the process developers are sent to the production unit where the process

If left unchecked, boundary lines between functions can become rigid and impermeable. Rotating managers in temporary assignments across these boundaries helps keep the lines fluid and informal.

will be implemented.

They are allowed to return to their usual posts only after that unit's operations manager is convinced that the process is working properly.

Integration of roles. Another way in which high-tech companies try to prevent organizational, and particularly hierarchical, barriers from rising is through multidisciplinary project teams, "special venture groups" and matrix-like organiza-

tional structures. Such structures, which require functional specialists and product/market managers to interact in a variety of relatively short-term problem-solving assignments, both inject a certain ambiguity into organizational relationships and require each individual to play various organizational roles.

For example, AT&T uses a combination of organizational and physical mechanisms to promote integration. The advanced development

sections of Bell Laboratories are located at the former Western Electric plants.

This location creates an organizational bond between development and Bell's basic research and an equally important spatial bond between development and the manufacturing engineering groups at the plants. In this way, communication is encouraged among development and the other two groups.

Long-term employment. Long-term employment and intensive training are also important integrative mechanisms. Managers and technologists are more likely to develop satisfactory working relationships if they know they will be harnessed to each other for a good part of their working lives. Moreover, their loyalty and commitment to the firm are

If you miss the next 3 issues of CW Office Automation, look at the issues you'll miss

August

In this issue we'll look at microcomputer word-processing software, using product reviews and case histories. Plus, we'll show readers how to decide which products meet their current and future needs.

Closes July 6

October

Readers will get the latest on integrated workstations and word processing. We'll make product comparisons, evaluate systems, and examine equipment capabilities. And we'll discuss hardware compatibility, hardware upgrades, and cost-effective ideas.

Closes August 31

December

Coverage includes user interfaces, natural language, data bases, decision support systems, information centers, and artificial intelligence. Also, we'll highlight user education and vendor trends to increase the current and future benefits of systems software.

Closes October 26

Call the Sales Office nearest you to reserve space for your ad, or to get more information. Or fill out the coupon below and return it to Ed Mawick, National Sales Director, Computerworld, 175 Cochran Road, Box 880, Framingham MA 01701. Do it today.

| | |
|--|---------------------------------|
| To: Ed Mawick, National Sales Director | |
| Computerworld | |
| 175 Cochran Road, Box 880 | |
| Framingham MA 01701 | |
| <input type="checkbox"/> Please send me advertising information on: | |
| <input type="checkbox"/> | the Applications Software issue |
| <input type="checkbox"/> | the Workstations issue |
| <input type="checkbox"/> | the Systems Software issue |
| <input type="checkbox"/> Please have a sales representative call me. | |
| Name _____ | |
| Title _____ | |
| Address _____ | |
| City _____ | State _____ Zip _____ |
| Telephone _____ | |

Computerworld
OFFICE AUTOMATION

BOSTON: 175 Cochran Road, Box 880, Framingham MA 01701 (617)794-0700
CHICAGO: 1620 South River Road, Suite 204, Des Plaines IL 60018 (312)871-9431
NEW YORK: Paramount Plaza 1, 140 Route 17 North, Paramus NY 07652 (201)957-1330
ATLANTA: 1911 Parker Road, Suite D, Atlanta GA 30336 (404)394-0756
SAN FRANCISCO: 820 Broadway, Suite 20, San Francisco CA 94111 (415)391-1330
LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine CA 92714 (714)261-1230

IN DEPTH/FOLLOWING THE LEADERS

increased if they know the firm is continuously investing in upgrading their capabilities.

At Tandem Computers, Inc., technologists regularly train administrators on the performance and function of the firm's products and, in turn, administrators train the technologists on personnel policies and financial operations.

4. **Entrepreneurial culture.** While continuously striving to pull the organization together, successful high-tech firms also display fierce activism in promoting internal agents of change.

Indeed, the ease with which small entrepreneurial firms innovate has always inspired a mixture of puzzlement and jealousy in larger firms. When new ventures and small firms fail, capital shortages and managerial errors are usually to blame. Nonetheless, time and again they develop remarkably innovative products, processes and services with a speed and efficiency that baffle the managers of large companies. The Apple II, which created a new industry, and Genesee's genetically engineered insulin are of this genre. The explanation for a small entrepreneurial firm's innovativeness is straightforward, yet it is difficult for a large firm to replicate its spirit.

Entrepreneurial characteristics. First, the small firm is typically blessed with excellent communication. Its technical people are in continuous contact (and often in cramped quarters). They have lunch together, and they call each other outside of working hours. They come to understand and appreciate the difficulties and challenges facing one another. Sometimes they will change jobs or debate up to break a critical bottleneck; often the same person plays multiple roles. This overlapping of responsibilities results in a second blessing: a dissolving of the classic organizational barriers that are major impediments to the innovating process.

Third, key decisions can be made immediately by the people who first recognize a problem, not later by top management or by someone who barely understands the issue. Fourth, the concentration of power in the leader/entrepreneur makes it possible to deploy the firm's resources very rapidly. Finally, the small firm has access to multiple funding channels, from the family dentist to a formal public offering. In contrast, the manager of an R&D project in a large firm has effectively only one source, the "corporate bank."

Small divisions. In order to re-create the entrepreneurial climate of the small firm, successful large high-

tech firms often employ a variety of organizational devices and personnel policies. First, they divide and subdivide. HP, for example, is made up of 50 divisions. The company has a policy of splitting divisions soon after they exceed 1,000 employees. TI is subdivided into more than 30 divisions and 250 "tactical action programs." Until recently, 3M's business was split into 40 divisions. Although these di-

visions sometimes reach \$100 million or more in sales, by Fortune 500 standards they are still relatively small companies.

Variety of funding channels. Second, such high-tech firms employ a variety of funding channels to encourage risk taking. At TI, managers have three distinct options in funding a new R&D project: If their proposal is rejected by the centralized Strategic Planning (OST)

System because it is not expected to yield acceptable economic gains, they can seek a Wild Hare grant. The Wild Hare program was instituted by Patrick Haggerty, while he was TI's chairman, to ensure that good ideas with long term potential were not systematically turned down. Alternatively, if the project is outside the mainstream of the OST System, managers or engineers can contact one of dozens of

individuals who hold Idea grant purse strings and who can authorize up to \$25,000 for prototype development. It was an Idea grant that resulted in TI's highly successful Speak and Spell learning aid.

3M managers also have three choices. They can request funds from their own division, corporate R&D or the new ventures division. This willingness to allow a variety of funding channels



ON APRIL 17, TEN EYEWITNESSES SAW THIS SAMNA DISKETTE MURDER A WANG.

IN DEPTH/FOLLOWING THE LEADERS

has an important consequence. It encourages the pursuit of alternative technological approaches, particularly during the early stages of a technology's development, when no one can be sure of the best course to follow.

IBM, for instance, has found that rebellion can be good business. Arthur K. Watson, the founder's son and a longtime senior manager, once described the way

the disk memory was developed: "It was not the logical outcome of a decision made by IBM management; [because of budget difficulties] it was developed in one of our laboratories as a booting project. A handful of men... broke the rules. They risked their jobs to work on a project they believed in."

Tolerance of failure. Moreover, the successful high-technology firms tend to be very tolerant of techno-

logical failure. At HP, according to Bob Hingata, general manager of the Medical Supplies Division, "It's understood that when you try something new you will sometimes fail." Similarly, at IBM, those who fail to turn their pet project into a commercial success almost always get another chance. Richard Frankel, the president of the Kevex Corp., a \$20 million instrument manufacturer, once put it this

way: "You need to encourage people to make mistakes. You have to let them fly in spite of aerodynamic limitations."

Opportunity to pursue outside projects. Finally, these firms provide ample time to pursue speculative projects. Typically, as much as 20% of a productive scientist's or engineer's time is "unprogrammed," during which he is free to pursue interests that may not lie in

the mainstream of the firm. IBM Technical Fellows are given up to five years to work on projects of their own choosing, from high-speed memories to astronomy.

5. Sense of integrity. While committed to individualism and entrepreneurship, at the same time successful firms tend to exhibit a commitment to long-term relationships. The firms view themselves as part of an enduring community that includes employees, stockholders, customers, suppliers and local communities. Their objective is to maintain stable associations with all of these interest groups.

Although these firms have clear-cut objectives regarding growth, profits and market share, they consider them subordinate to higher order ethical values. Honesty, fairness and openness—that is, integrity—are not to be sacrificed for short-term gains. Such companies do not knowingly promise what they cannot deliver to customers, stockholders or employees. They do not misrepresent company plans and performance. They tend to be tough but forthright competitors.

Herb Dwight, president of laser manufacturer Spectra-Physics, once said, "The managers who succeed here go out of their way to be ethical." And Alexander d'Arbeloff, co-founder and president of Teratony, has stated bluntly, "Integrity comes first. If you don't have that, nothing else matters."

These policies may seem utopian, even impractical, but in a high-tech firm they also make good business sense. Technological change can be dazzlingly rapid; therefore, uncertainty is high, risks are difficult to assess and market opportunities and profits are hard to predict. It is almost impossible to get a complete product into production, for example, without solid trust between functions, between workers and managers and between managers and stockholders (who must be willing to see the company through the possible dips in sales growth and earnings that often accompany major technological shifts).

Self-understanding. This sense of integrity manifests itself in a second, not unrelated, way—self-understanding. The price, almost everywhere, of these firms in their ability to compete in their chosen fields is tempered by a surprising acknowledgment of their limitations. One has only to read HP's corporate objectives or interview one of its top managers to sense this extraordinary blend of strength and humility. Successful high-tech companies are able to reconcile their "dream" with what they can realistically

SAMNA Office Automation Software for PC's* outperforms dedicated word processors.

We asked a group of Office Automation professionals to compare SAMNA Office Automation software to the dedicated word processors they've used the most.

The results were shocking. All 10 of the Office Automation people surveyed were convinced that SAMNA far surpassed their stand-alones in terms of pure power, functionality, and user interface. In fact, they felt SAMNA had outperformed them.

SAMNA offers high-powered features like screen-to-page fidelity, with on-screen display of special formats. Split screen editing. Automatic pagination and footnoting. Automatic search and replacement. Glossary of standard paragraphs. Easy addition, deletion, and movement of text. Electronic field that lets you "fold" a wide page to compare left and right margins side by side. Zoom that shrinks a whole page until it's entirely displayed on screen. Three levels of Help that guide you through whatever command you're working on. And much, much more.

When the comparison was over, all 10 participants said SAMNA outclassed any word processor they'd ever used. And word processing was only the beginning.

Seamless Integration™ means SAMNA can work with text, math, line drawings, and more...without a break.

SAMNA lets you work with text, then switch to integrated five-function math, free-form line drawing, list management, or spelling checker as you need them. Without a break or interruption. Without going back to a window or changing screens. It gives you an uninterrupted flow of work that's faster, more natural, more productive.

SAMNA also accepts ASCII files directly from other software. So you can use it with Lotus 1-2-3®, dBase II®, even WordStar®.

The better you get, the faster SAMNA gets.

As you become more proficient in using SAMNA, you can go directly from one function to another without going back to a lengthy pull-down menu to select your next keystroke. It's as if SAMNA were thinking along with you, staying one step ahead of what you need to help you work faster.

All of this, plus. It could only be SAMNA.™

Start with the power and productivity of SAMNA's word processing and Seamless Integration.™

Then include an integrated, interactive spreadsheet that will allow you to change a number in the spreadsheet and have the resulting change automatically made to a number in the accompanying text. That's SAMNA.™

To arrange for a free demonstration by the dealer nearest you, call 1-800-241-2065 (SAM-8PM EST, Mon.-Fri.).

SAMNA Office Automation Software.

More powerful. More productive.



SAMNA

More powerful. More productive.

SAMNA Corporation, 2700 N.E. Bayview, Atlanta, GA 30345.

*SAMNA is available on IBM PC, IBM compatible, XT Professional, and DEC hardware microcomputers.

The following names are trademarks of the following companies: DEC and Software of Digital Equipment Corporation; IBM, of International Business Machines Corporation; Microsoft, of Microsoft Corporation; Lotus, of Lotus Development Corporation; dBase II, of Borland Software Corporation; WordStar, of WordStar Corporation; and King of King Laboratories.

IN DEPTH/FOLLOWING THE LEADERS

achieve. This is one of the reasons they are reluctant to diversity into unknown territories.

6. "Humble-on" top management. Notwithstanding their deep sense of respect and trust for individuals, CEOs of successful high-tech firms are usually actively involved in the innovation process to such an extent that they are sometimes accused of meddling. Tom MacAvoy, president of Corning Glass Works, sifts through hundreds of project proposals each year trying to identify those that can have a "significant strategic impact on the company" — the potential to restructure the company's business.

Not surprisingly, most of these projects deal with new technologies. For one or two of the most salient ones, he adopts the role of "field

Good high-tech managers not only understand how organizations and, in particular, engineers work, they understand the fundamentals of their technology and can interact directly with their people about it.

general." He frequently visits the line operations, receives direct updates from those working on the project and assures himself that the required resources are being provided.

Similar patterns can be identified in many larger high-technology firms. Milt Greenberg, president of GCA, a \$180 million semiconductor process equipment manufacturer, stated: "Sometimes you just have to

short-circuit the organization to achieve major change." Tom Watson Jr. and Vince Learson were doing just that when they met with programmers and designers and other executives in Watson's old cabin in Vermont to finalize software design concepts for the IBM 300 — at a point in time when IBM was already a \$4 billion firm.

Good high-tech managers not only understand how organizations and,

in particular, engineers work, they understand the fundamentals of their technology and can interact directly with their people about it. This does not imply that it is necessary for the senior managers of such firms to be technologists (although they usually are in the early stages of growth); neither Watson nor Learson were technologists. What appears to be more important are the ability to ask lots of questions, even "dumb" questions, and dogged persistence in order to understand in depth such core questions as: 1) how the technology works; 2) its limits, as well as its potential (together with the limits and potential of competitors' technologies); 3) what the various technologies require in terms of technical and economic resources; 4) the direction and speed of change; and 5) the available technological options, their cost, probability of failure and potential benefits if they prove successful.

Paradox of management

The six themes around which we arranged our findings can be organized into two apparently paradoxical groupings: business focus, organizational cohesion and a sense of integrity fall into one group; adaptability, entrepreneurial culture and hands-on management fall into the other.

On the one hand, business focus, organizational cohesion and integrity imply stability and conservatism. On the other hand, adaptability, entrepreneurial culture and hands-on management are synonymous with rapid, sometimes precipitous change. The fundamental tension is between order and disorder. Half of the success factors pull in one direction; the other half tug the other way.

Not only do formal organizations resist innovation, they often act in ways that stomp it out. Overcoming such behavior — which is analogous to the way the human body mobilizes antibodies to attack foreign cells — is, therefore, a core job of high-tech management.

High-tech firms deal with this challenge in different ways. TI, long renowned for the complex, interdependent matrix structure it used in managing dozens of product-customer centers (PCC), recently consolidated groups of PCCs and made them into more autonomous units. "The manager of a PCC controls the resources and operations for his entire family. . . . In the simplest terms, the PCC manager is to be an entrepreneur," explained Fred Bucy, TI's president.

Meanwhile, a different trend is evident at 3M, where entrepreneurs have been given a free rein for decades. A recent major reorganization was designed to arrest snowballing diversity by concentrating the company's sprawling structure of autonomous divisions into four market groups. "We were becoming too fragmented," explained Vincent Ruane, vice-president of 3M's electronic division.

Similarly, HP recently reorganized into five groups, each with its own strategic responsibilities. Although this reorganization simply changes some of its reporting relationships, it does give HP, for the first time, a means for integrating product and market development across generally autonomous units.

These reorganizations do not

World's Fastest Serial Printer

Line printer performance at half the cost

Up to 300 lpm throughput at 600 cps

Letter Quality/Correspondence at 100/150 cps

High Density Graphics

Lowest cost per character

Florida Data Printers give you line printer throughput at well under line printer prices. They match line printer performance on many types of jobs. Throughput is optimized by Florida Data's patented stored energy printhead — the world's fastest.

The reliable automatic cut sheet feeder is an integral part of the printer — not an expensive add-on. The unique triple paper path also allows continuous forms and hand fed sheets. These printers are built to run 365 days a year. And nationwide NCR service is part of the package.

Call (305) 259-4700 or mail coupon for details

Florida Data Corporation
6000 John Rhodes Blvd.,
Melbourne, FL 32935

Send me information on your OSP printers.

NAME TITLE
COMPANY
ADDRESS
CITY/STATE/ZIP
TELEPHONE

NCR

NCR is a Registered Service Mark

**FLORIDA
DATA**

The TeleVideo PC compatibles. The best hardware for the best software.

TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.
With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market and has the standard — not optional — features you need to take full

THE BEST HARDWARE FOR THE BEST PRICE.

| Features | Tele-PC | IBM PC | Tele-XT | IBM XT |
|-----------------------|--------------|-------------|---------|-------------|
| Monitor | YES | OPTIONAL | YES | OPTIONAL |
| Screen Size | 8" | 12" | 8" | 12" |
| Tilt Screen | YES | NO | YES | NO |
| Quiet Operation | YES (NO FAN) | NO | YES | NO |
| Memory | 128K | 128K OPTION | 256K | 256K OPTION |
| Graphics Display | YES | OPTIONAL | YES | OPTIONAL |
| 840x320 resolution | YES | OPTIONAL | YES | OPTIONAL |
| Printer Port | YES | OPTIONAL | YES | OPTIONAL |
| Communication Port | YES | OPTIONAL | YES | OPTIONAL |
| MS "DOS/BASIC" | YES | OPTIONAL | YES | OPTIONAL |
| System Expansion Slot | YES | YES | YES | YES |
| RGB and Video Port | YES | OPTIONAL | YES | OPTIONAL |
| Typical System Price | \$2995 | \$3945 | \$4495 | \$6794 |

advantage of every job your software can do.

Study the chart below. It proves that TeleVideo — not IBM — offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculptured keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8086 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) micro-chips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.

For example, our tiny custom chips do the

work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST PORTABLE FOR THE BEST PRICE.

| Features | TPC-II | IBM PC |
|-----------------------|--------------|----------|
| High Capacity Storage | Yes | Yes |
| Quiet Operation | Yes (No Fan) | No |
| Display | Monochrome | Analog |
| Memory | 768K | 256K |
| Graphics | Yes | Yes |
| Communications Port | Yes | Optional |
| Printer Port | Yes | Optional |
| MS "DOS" 2.11 | Yes | Optional |
| Typical System Price | \$5295 | \$5195 |

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the chart at the left.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than IBM. Better hardware—standard—at a better price.

THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

Call 800-538-6725 for the dealer nearest you. In California, call 800-345-8008.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM—has the best hardware for the best software. At the best price.

IBM is a registered trademark of International Business Machines. MS-DOS is a trademark of Microsoft Corporation. CBI Basic is a registered trademark of Microsoft Corporation.

TeleVideo
Personal Computers
© TeleVideo Systems, Inc.

Finally,

frame connection
in the company who
needs it.

Facility software lets you quickly transfer files to and from the host. So you can take full advantage of the PC's processing capabilities. While keeping connect time to a minimum.

To reduce your applications backlog, we offer m3278/SPF™ software with our PCOX interface. It works just like the host's SPF. Only at the PC level. So your programmers can work off-line. And free up the mainframe for other users.

Finally, there's CONNEWS™. Our unique software program that presents data in an easy-to-understand format. Now you can spend less time looking at data and more time using it.

EVERYONE WHO WANTS TO USE THE COMPANY MAINFRAME RAISE YOUR HAND.

Introducing power to the people.

Better known as the Data Pipeline[™] from Intel.

It's based on our iDIS[™] Database Information System. A powerful, integrated package of hardware and software with multi-user capability built right in. And now, through iDIS, just about any pc or terminal can easily share data with just about any mainframe.

With the iDIS Pipeline, you'll be able to establish and manage your pc-to-mainframe connections in a way never before possible. Yet you'll still be able to offer department users a fair degree of independence. Since iDIS comes with all

the software they need. Starting with the Xenix[®] operating system, built around a relational DBMS. Plus the Multi-plan[®] spreadsheet, word processing, electronic mail, and a forms/menu development tool.



Our Data Pipeline[™] allows practically any pc to share data with practically any mainframe.

The iDIS Pipeline is powerful, too. Each one will handle 5 full-time users, or between 12 and 15 on dial-up. And you can even network with other iDIS systems. But you're always in control. You decide which data are

accessible, and extract only those to your iDIS system. Users then access their data sets from iDIS's hard disk.

Actually, using the iDIS Pipeline is a lot like giving users their own little mainframe.

Which is a lot better than giving them yours.

It's also a lot cheaper.

Less than half the cost of a direct pc-to-mainframe connection.

It's also fully supported and serviced from one responsive source. Us. Best of all, it's available now.

For more information about how our iDIS Data Pipeline can help you manage the revolution in your office, call us at 800-538-1876; in California, 800-672-1833. Or write Intel, Lit. Dept. H-18, 3065 Bowers Ave., Santa Clara, CA 95051.

Of course, if you're undecided about what to do you can always ask for a show of hands...

intel

IN DEPTH/FOLLOWING THE LEADERS

mean that organizational integration is dead as TI or that 3M's and HP's entrepreneurial culture are being dismantled. They signify first that these firms recognize that both organizational integration and entrepreneurial culture are important and, second, that periodic change is required for environmental adaptability. These three firms are demonstrating remarkable adaptability by reorganizing from a position of relative strength — not, as is far more common, in response to financial difficulties. Lewis Lehr, 3M president, explained, "We can change now because we're not in trouble."

Such reversals are essentially antibureaucratic, in the same spirit as Mao's admonition to "let a hundred flowers blossom and a hundred schools of thought contend." At IBM in 1983, Tom Watson Jr. temporarily abolished the corporate management committee in an attempt to push decisions downward and thus facilitate the changes necessary for IBM's great leap forward to the 360. Disorder, slack and ambiguity are necessary for innovation, since they provide the porosity that facilitates entrepreneurial behavior — just as do geographically separated, relatively autonomous organizational subunits.

But the corporate management committee is alive and well at IBM today, as it should be. The process of innovation, once begun, is both self-

perpetuating and potentially self-destructive. Although the top managers of high-tech firms must sometimes engender organizational disorder, for the most part they must preserve order.

Winnowing old products

Just as the long-term success of the firm requires the planting and nurturing of new products, it also requires the conscious, even ruthless, pruning of other products so that the resources they consume can be used elsewhere.

This requirement demands hard-nosed leaders who are continually managing the functional and divisional interfaces of their firms. They cannot be swayed by nostalgia or by the fear of disappointing the many committed people who are involved in the development and production of discontinued products. They must also overcome the natural resistance of their subordinates and even their peers, who often have a vested interest in the products that brought them early personal success in the organization.

Yet firms also need a certain amount of continuity because major change often emerges from the accretion of a number of smaller, less visible improvements.

Indeed, most engineers, managers, technologists and manufacturing and marketing specialists work on what Thomas Kuhn might have called "normal innovation," the little steps

that improve or extend existing product lines and processes.

Managing ambivalently

The successful high-technology firm, then, must be managed ambivalently. A steady commitment to order and organization will produce one-order Model T Fords. Continuous revolution will bring incremental productivity gains. Many companies have found that alternating periods of relaxation and control appear to meet this dual need. Surprisingly, such ambiguity does not necessarily lead to frustration and discontent. In fact, interspersing periods of tension, action and excitement with periods of reflection, evaluation and revitalization creates the same sort of irregular rhythm that characterizes many popular pastimes — including sailing, which has been described as "long periods of total boredom punctuated with moments of stark terror."

Knowing when and where to change from one stance to the other and having the power to make the shift are the core of the art of high-technology management. James E. Webb, administrator of the National Aeronautics and Space Administration during the Apollo program, recalled, "We were required to fly our administrative machine in a turbulent environment, and... a certain level of organizational instability was essential if NASA was not to lose control."

In summary, the central dilemma of the high-technology firm is that it must succeed in managing two conflicting trends: continuity and rapid change. There are two ways to resolve this dilemma. One is an old idea: managing different parts of the firm differently — some business units for innovation, others for efficiency.

A second way — a way we believe is more powerful and pervasive — is to manage differently at different times in the evolutionary cycle of the firm. The successful high-technology firm alternates periods of consolidation and continuity with sharp reorientations that can lead to dramatic changes in the firm's strategies, structure, controls and distribution of power. Thomas Jefferson knew this secret when he wrote 200 years ago, "A little revolution now and then is a good thing."

About the authors

Moderate Madsique is associate professor of engineering management at Stanford University. His teaching and research interests center on the management of the technological firm.

*Robert Hayes is professor of business administration at the Graduate School of Business Administration at Harvard University. He is the author of *Restoring Our Competitive Edge: Competing Through Manufacturing*, to be published by John Wiley & Sons.*

Turns Spaghetti Code COBOL into Structured COBOL Automatically

SUPERSTRUCTURE takes your unstructured COBOL programs and automatically produces structured COBOL programs that are easy to understand and maintain. SUPERSTRUCTURE provides a simple and cost effective alternative to manually rewriting those unstructured programs that are a maintenance nightmare. Of course you can't believe it. Let us prove SUPERSTRUCTURE works... using your programs at your location. SUPERSTRUCTURE—the breakthrough you've been waiting for. Call today. Marketing Director—SUPERSTRUCTURE.

Group Operations, Incorporated
1110 Vermont Avenue, N.W.
Washington, D.C. 20005
(202) 687-5420
Offices in Boston, Cleveland, Dallas,
Los Angeles, and New York



DATATRIEVE'S BEST FRIEND IS SMARTSTAR



SMARTSTAR 4th generation data management software gives VAX® Datatrieve a friendly, forms-based user interface. Here's how:

- Supports all Datatrieve data-types
- Allows up to 31 overlapped window applications
- Adds, changes and deletes records with easy typed commands
- Performs queries without special query language

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

SEND COUPON NOW FOR COMPLETE DETAILS AND JOIN THE 4TH GENERATION.

SI **Signal Technology, Inc.**

1861 Serrano Road, Suite 400, CA 92117 (619) 582-3771 Outside California call toll-free (800) 855-8722
TELE 619-236-3471

SI and Datatrieve are trademarks of Digital Equipment Corporation.

VIEWPOINT

How to tell if your DBMS venture will be successful



THE DATA
CENTER
John P. Murray

This is the second in an eight-part series.

One consideration that is often overlooked (perhaps ignored would be a more appropriate word) in the development of a data base management system (DBMS) environment is that of determining the relative success of the venture. Unless some criteria are developed against which to judge the result of the DBMS, an objective analysis of the effort will prove elusive.

Two areas should be given attention in choosing criteria for evaluating the DBMS results. These issues are:

■ What criteria should be established as a basis for judging the relative success of the DBMS?

■ Why is the development of such criteria important?

To address the last question first, development of meaningful DBMS criteria serves to establish standards by which the results of the DBMS will be judged. Without a set of recognized goals against which the DBMS progress can be measured, the effort will tend either to languish or to drift in an uncontrolled fashion. Absent a set of meaningful criteria that can provide direction and control, there is a tendency to chase after every client or MIS DBMS proposal or whim. To succeed, the DBMS general plan must be set and adhered to, and some what may. Therefore, the plan must be good, and it must be based on strong, sound criteria.

What of the criteria themselves? The first issue to consider is not the selection of a particular DBMS, but the ultimate business purposes that are to be served by the DBMS. The answer, of course, will be different in various organizations. Keep in mind that, to be successful, the DBMS installation

must serve to advance the business, not the technical aspirations of the MIS department. Therefore, the salient DBMS criteria must be: What will it do for the business? The technical considerations should follow.

The real potential to change an organization (for good or ill) rests with the DBMS. By itself, the DBMS is by no means a panacea. In fact, the selection of a poor DBMS, or the failure to manage the DBMS correctly, even a good one, will at best mean a number of lost opportunities for the organization; at worst, it can produce grievous consequences. The clearer the vision of the business use of the DBMS, the better will be the chance for the eventual success, not only of the DBMS, but of the entire enterprise.

Objectives of the DBMS

A general statement about the objectives of the DBMS, in terms of its use for the business, might be: "To provide all MIS clients with the ability to access the organization's data quickly and easily, and through the use of that data, enable clients to develop programs and produce their own information outside the constraints of the MIS department. The goal of the DBMS process will be, insofar as is practical, to capture all the organization's data, one time at the source, and then make that data available throughout the organization. The purpose of the development of the DBMS environment is to provide a vehicle to manage the organization better."

If that is a reasonable, if perhaps concise, expression of the DBMS objective, a number of specific issues can then be posed based upon that premise. Some of those issues would include:

■ Is all the organization's data, within practical limits, to be placed under the DBMS?

■ How do we map out a plan to reduce and control redundant data? (When we began our DBMS project and began to realize how much redundant data we had accumulated over the years, I was convinced all redundancy was evil and should be rooted out. Today, I am comfortable with the concept of some controlled redundancy within the DBMS environment.)

■ Do we wish to encourage the greatest possible

use of the DBMS facilities and the fourth-generation programming language by MIS clients? If so, are we willing to face up to the issue of the requirements for large and expanding hardware facilities to support the user?

■ How will the data be structured within the data base?

■ Who will determine those structures and decide what are the most appropriate design criteria under the DBMS?

■ Are we willing to move from a Cobol to a fourth-generation programming milieu in the MIS department? Are we willing, at some given point in time, to restrict the use of Cobol severely?

■ Are we willing to provide the required training to support the DBMS in both the MIS and client areas?

■ Will MIS make the required marketing effort to sell the DBMS concept and the use of fourth-generation programming languages within the organization?

■ Is MIS management willing to develop and enforce the disciplines and the Aristotle required both to support and to fight for the benefits of the DBMS over the long haul?

■ Are both MIS management and senior management aware of the real issues involved in the building of a DBMS environment that will support the stated objectives of the business purpose of the DBMS?

So, it follows that once a concept of the DBMS role has been identified, the next step is to consider the individual criteria that affect the success of that concept.

What is the value of all this? It sounds like a great deal of work. Building an effective DBMS environment is a massive task. The value of defining DBMS goals and criteria is that it focuses people to realize the real DBMS issues before the DBMS environment has become entrenched. Speaking impartially, I can state that it is much better to understand and address these issues in the beginning than to be faced with them (as we were and are) as the DBMS environment builds.

Once the criteria have been determined, they can then be incorporated into the overall DBMS

See DBMS page 96

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of *Management Information Systems as a Corporate Resource*, published by Dow Jones-Irwin.

Portables link personal with professional goals



HUMAN
CONNECTION
Jack Stone

After nearly three decades of frustration in dealing with centralized business systems and user-hostile terminals, all users have become aware of the beginnings of a new form of DP life. That life is organized around personal systems and user-friendly interfaces, and, according to users' perceptions, offers to liberate them from the bondage of the vast bureaucracies of computer departments.

One reason for the current ground swell of personal computer excitement in user camps is because the users view the micro as devices that can help them personally, as distinguished from helping the business. That is to say, users see the potential for these machines to enable them to perform better on the job, certainly by increasing productivity, but much more importantly, by increasing the quality of their output.

Other words, the astute go-getters in the operating departments have found a red-hot link be-

tween their abilities to handle a personal computer at the office and the advancement of their careers. Those knowledgeable, for example, in Lotus Development Corp.'s 1-2-3 plus Multimate Software Systems, Inc.'s Multimate or any similar system are flying jet streams toward their personal goals, as opposed to collingues without the capability, who are trying to hold on to the treadmill, if not losing their competitive standing altogether.

Indeed, these days, if a center wants to build the long-standing divisions that have separated it from the user population, it can establish in its user support group an individual to consult with the user departments on the acquisition, operation and support of personal computers. This one person can go a long way in building friendships anew and rekindling cooperative attitudes.

Best concept going

And if you haven't discovered it for yourself yet, be so advised that the portable personal computer is the best concept going, even though the ideal configuration is slightly down the proverbial pipe. The notion of providing a company-paid portable for each desk and office is a beauty, but dragging a 30- to 30-pound behemoth home every night on the subway sinks it, pure and simple. Far better to choose notebook-style laptops for their high coefficient of carrying ease, with a feed to full-function desktops, as long as there is enough computer to handle specific jobs.

A round of applause for Tandy Corp., NEC Corp.

and others for opening the doors to the laptop, but the low-priced machines (under \$1,000 and a humble random-access memory [RAM], though brilliant technological achievements (excepting the cloddish cassette tape drive), are too specialized for typical users, in my judgment, at least at this point in time. A better bet — if one can spring new some additional greenbacks — are machines like Sharp Associates' new 6000 or, better still, Teleram Communications Corp.'s combined lap-style portable plus desktop station.

Teleram offers a system today that seems to exemplify the next generation of personal computers — a powerhouse portable that integrates into a powerhouse desktop. The company, which has made a reputation as a supplier of portable text editors for writers, offers a lap-style portable unit with 64K bytes of RAM. Mass storage for the machine is a fixed, nonvolatile bubble memory with a whopping 128K-byte capacity (expandable to 256K bytes). Digital Research, Inc.'s CP/M is standard, UCSD P-system is optional and IBM Personal Computer disk formats are supported.

The lap-style portable plugs neatly into an office station, saving space, making up the desktop configuration. The station houses a video monitor, controller and provides attachments to one or more diskette drives. So the user downloads programs and data from floppy to the bubble, uploads the portable and off he runs. Can you believe it? A CP/M machine does away with rechargeable battery or, in a pinch, from the cigar lighter in your car.

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Does MIS success hinge on the state of the art?



LETTERS

After reading John P. Murray's article "MIS and a state-of-the-art environment" (CW, April 9), I felt that a reply was necessary.

The greatest part of this article is spent suggesting methods to convince senior management to spend the considerable sums involved in moving to a state-of-the-art environment. Very little time is devoted to explaining exactly what a state-of-the-art environment actually is. Nor is any sig-

nificant effort directed toward developing sound business reasons why a state-of-the-art environment is so critically needed.

I must assume, based on the first few paragraphs, that state of the art implies use of the latest hardware and software advances, including data base management systems (DBMS), fourth-generation languages and information centers. The actual meaning intended for state of the art is critical if the reader is to understand Murray's conclusion that "the eventual success or failure of [an] organization may rest upon the determination of [an] organization's MIS management to move to and then to

maintain the state-of-the-art environment."

There are, of course, many examples of data centers that would be considered behind the state of the art, yet are very successful in their function of supporting the corporate information processing requirements.

Disk units, a DBMS and an information center could help the MIS mission, of course, but should be installed only after sound business reasons have been developed.

I suggest that the true measure of success of an MIS organization lies in the degree of support provided to the attainment of corporate strategic and

operational goals — not in the attainment of some nebulous measure of state-of-the-art technical advancement.

To provide such support effectively, the MIS director must naturally become part of the corporate management team. However, for this to happen, MIS people must be capable of acting as business managers, not as data processing technicians.

Undue emphasis upon the tools of our trade, rather than on the effective application of these tools, can only result in a less effective and less useful MIS organization.

These tools, as well as the more established ones, must be applied within a sound business plan after careful analysis of the organization's current and future information processing requirements.

Michael K. Fox
Data center manager
American International Group
Data Center, Inc.

In One Day, We'll Upgrade You from a 4300, and Remove "Down-time" from Your Working Vocabulary.

We know you're tight for time, so we'll make this short.

In fact, it's your problem with time we'd like to discuss. And eliminate.

We've developed a fault tolerant, program-compatible mainframe that can take you from where you are to where you want to be, in no time at all.

IPL's 4480.

For time-saving performance, the 4480 stands toe-to-toe with the most powerful 4300 you could move up to.

For maximizing uptime, it provides complete system redundancy that maintains a majority of processing capacity when a failure strikes. No matter where the failure may be.

For rapid integration into your IBM operating environment, no other fault tolerant mainframe can match the ease and simplicity — and Day One start-up — you get when you upgrade to a 4480.

If you had the time, we'd also tell you about the 4480's unique configuration flexibility. Or point out its powerful service processor and remote maintenance capabilities.

We might even introduce our 4460 mainframe, in its powerful alternative to 4300's.

As it is, there's just enough time to mention the price difference between the 4480 and the top-of-4300.

For all the facts about our 4480, contact George Neuman at 617-890-6620, extension 291.

When you have the time, of course.

Better yet, when you need the time.

ipl SYSTEMS INC.

When You Have No Time To Lose
1570 Main Street, Woburn, MA 02154

DBMS from page 65

plan. As an example, what you want the DBMS to do will have an impact on the system you select and the approach you take in selling the plan to senior management. If the DBMS is to be installed and controlled by the technical support group, then issues such as the use of fourth-generation programming by MIS clients and client training are probably not particularly relevant.

Conversely, if the goal is to install the DBMS and build the best possible information environment for MIS clients and therefore the organization, those same issues are indeed salient. They should be recognized as such from the start.

Building the DBMS environment is no different, in terms of planning, from any other MIS project. The basics of project management apply here as surely as anywhere else. The key to success, just as with any MIS application project, is to have the clearest possible vision of the ultimate goals of the project prior to commencing.

Next: Guidelines to selecting and installing your DBMS.

LETTER from page 64

are not just converting to the System/38, but are in the very enviable position of complete reanalysis, redesign and total replacement of all existing systems to take full advantage of the System/38's state-of-the-art design and technology. It has been an interesting struggle to get the company's management to commit the necessary resources, but the probability is that if we don't do it now, we will have to do it later, at greater cost, from even more obsolete systems.

It is a dilemma, and we are, in a very real sense, fortunate to be small enough in size and large enough in thinking and fortitude to be able to forge ahead. There are others in my company's position, and I am certain they could benefit from more coverage of a system that offers a way out of the S/38's architectural chains.

Paul Alberts
Data processing manager
Ridgeway Mills, Inc.

GET A GRIP ON LOST DATA

Introducing Dymek's R.I.D.—Daily Assurance That You Can Recover Data With Integrity And Provide Data Interchange Between Drives.

Dymek's R.I.D. (Recording Interchange Diagnostic) is a low cost insurance policy for your software library investment. Used daily, R.I.D.'s seven 'pass/fail' drive tests assure the ability to interchange data between drives.

That means in less than a minute a morning you can be ready to read and write with complete confidence in your system.

Your confidence is well founded too, because Dymek is the drive alignment expert. Independent of any drive or media manufacturer, Dymek is the leading supplier of alignment diskettes to head, drive and system manufacturers worldwide.

In fact, R.I.D.'s seven tests of drive speed; noise tolerance; write/read; alignment; backlash/hysteresis; clamping and erase cross-talk are engineered to the exacting standards these OEM customers rely on.

So get a grip on lost data. Ask for Dymek's R.I.D. at your local computer store. Or call our distributor, Media Products, at (800) 858-7700 (outside California) or (800) 345-4700 (inside California). R.I.D. is available now, at \$34.95 suggested retail, for IBM PC and XT, Apple and Radio Shack systems. Dealer inquiries are invited.



Dymek

WHEN A PERSONAL COMPUTER ISN'T ENOUGH, YOU NEED A PERSONAL PDP-11.

HOW YOU CAN SAVE DIGITAL'S PERSONAL PDP-11'S BUSINESS PDP-11 AND UNIX-COMPATIBLE SOFTWARE ON YOUR DESK.

You know who you are. You've been doing a major part of your work using a terminal connected to a PDP-11™ or VAX™ system. Your applications are as wide-ranging as your knowledge. Theoretical physics, real-time data analysis, statistics, financial modeling, CAD/CAM, process control—there's very little that's beyond the reach of your professional experience.

Like most users, you're very satisfied with the services you've been getting from your PDP-11. You've come to rely on them, in fact. And you're not willing to give them up for just a personal computer. What you really want is a full-powered minicomputer dedicated exclusively to your work.

If you're this type of user, Digital has exactly the computers you need: the Professional™ 300 Series, our personal PDP-11's. They're engineered to give you the minicomputer power and sophistication you've come to expect—in a personal computer size, and at a personal computer price.

THE PDP-11 INVESTMENT INVESTMENTS AT YOUR COMMAND.

Digital's Professional 300 Series, the best-engineered desktop systems for computer-experienced professionals, offer you a choice of minicomputer-

powered operating systems.

First among these is P/OS™, the Professional Operating System. A single-user, multi-tasking version of RSX-11M-PLUS,* it gives you capabilities that far exceed typical personal computer software. Its complement of compiler languages includes BASIC 11, DIBOL, COBOL-81, Pascal, FORTRAN-77, and WHITESMITH C. What's more, a Native Tool Kit and a rich selection of editors, debuggers, task builders, forms management and sort utilities helps you achieve the high programming productivity you've come to expect from a minicomputer. The UCSD-p System™ is available as an alternative development environment under P/OS. Plus, P/OS lets you use Digital Classified Software, a portfolio of proven applications such as TK! Solver,** a high-performance equation-solving tool, and RS/1,** an industry-standard laboratory research system.

Next, there's PRO/RT-11,** a single-user, multi-tasking, real-time version of the RT-11 operating system that's so popular in technical OEM PDP-11 applications. There's also the STANDARD MICRO MUMPS 300™ System. And for commercial applications there's the CTS 300™ system, which features RT-11 DIBOL portability.

UNIX® a UNIX® V7M operating system complete with Berkeley 4.1 enhancements, has been optimized for

the Professional Series. It even includes a UNIX System 5 software license, demonstrating our commitment to keeping the Professional current with future UNIX directions.

MINICOMPUTER STRENGTH IN APPLICATIONS. ON THE SINGLE READY TO GO.

The reason we've engineered the Professional with a variety of operating systems isn't just to let you write your own minicomputer-powered programs. It's to let you access a vast library of proven, devel-

oped PDP-11 and VAX RSX programs, and run them independently on your Professional.

Many third-party PDP-11 and VAX RSX applications—or the ones you're using now—can be transported to your Professional. You can use the same files, the same commands. This puts an incredible variety of scientific, industrial, technical and commercial solutions at your disposal.

Just as important, you can attach a real-time interface to the Professional to adapt it for scientific and industrial use. And you'll have a wide variety

of printers, plotters, and special purpose peripherals to choose from.

ALL-IN-1™ ON YOUR DESK

The Professionals acknowledge the fact that you work in an office as well as in a lab, offering Pro Office Workstation, the Professionals' version of Digital's ALL-IN-1™ software, the best-engineered office automation system you can buy. Running in conjunction with a VAX host, ALL-IN-1 gives you word processing, automatic spelling verification, electronic filing, electronic mail, calendar management and more. And that can increase productivity organization-wide.

Office automation tools designed for independent use on your Professional include Digital's ASK/IT™ software, which provides business

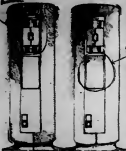
graphics, personal database, word processing and spreadsheet functions, plus a game. And with the optional CP/M® Softcard, you can run a variety of CP/M-80 packages on your Professional.

THE VIRTUAL PACKET LOCAL NETWORKING TOOL

The Professional 300 Series supports a variety of networking options. Foremost among these options is DECnet™, which lets your Professional serve as a distributed workstation with PDP-11 and VAX processors. And, DECnet gives you a choice of local and wide-area communications devices, including 10 Mb/sec Ethernet, with full support for V2.0 standard (IEEE 802.3 specification); public packet-switched X.25 networks; and standard telephone lines.

And by virtue of its compatibility with PDP-11 and VAX RSX software and RMS file structures, the Professional lets you

download remote files from your PDP-11 or VAX to your Professional, all transparently to the user and the program. Or, if you wish, your Professional can



emulate Digital's VT™ terminals.

The Professional doesn't leave out the rest of the world, either. Device emulation includes IBM 3270, 2780/3780, 3277, and more.

THE LEADING GRAPHICS INTEGRATION IN ITS CLASS.

If you only want to portray simple X-Y values, lots of personal computers can do the job. But if you need a way to graphically display thousands of information variables, there's no finer tool available than a Professional. It gives you a palette of 4,096 colors to work with. State-of-the-art graphics architecture, like GDIS™, a virtual device interface, helps you design fast graphics for your programs, while allowing them to run independently of future hardware enhancements. Industry-standard graphics application interfaces are also available. And the Virtual Device Meta file capability lets you integrate text and graphics in a single file under P/OS 2.0. Just as important, the quality of Professional 300 graphics is unsurpassed. The bit mapped screen provides a

960 x 240 pixel resolution. And Digital's IVS™ Interactive Video System is available for advanced program development.

THE BEST ENGINEERS HAVE ENGINEERS TO A PLAN.

The Professional 300 Series, like every Digital hardware and software product, is engineered to conform to an overall product plan. This means Digital systems are engineered to work together easily and expand inexpensively. Only Digital provides you with a single, integrated computing strategy from desk top to data center.

For more information on Digital's Professional 300 Series systems, the Professional 325 and the Professional 350, call 1-800-DIGITAL, ext. 690. Or send the coupon or write: Digital Equipment Corporation, Attn: Mr. Dennis Coady, 200 Baker Avenue, West Concord, Massachusetts 01742.

I'd like more information on Digital's Professional 300 Series, the Personal PDP-11's:

- ☐ Please send a copy of your new Professional Series Handbook.
☐ Please have a sales professional call with complete information.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____ Ext. _____

Return to: Digital Equipment Corporation, Attn: Mr. Dennis Coady, 200 Baker Avenue, West Concord, MA 01742.
Media Code: N.

THE BEST ENGINEERS COMPUTING IN THE WORLD

digital™

Displayed above is P/OS™, integrated software for scientific and engineering uses from IBM Software Products Corporation, a subsidiary of Burroughs and Newman Inc.

The freedom some birds have to migrate
is remarkably similar to the freedom
you have with software for the System 8000.

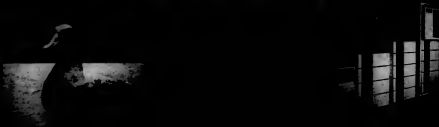


Moving your application
program with Zilog's System 8000
is as easy as the migration of
birds.

Just as birds migrate from you
to a new environment of
freedom.

Zilog's high performance, multi-
user, UNIX[®]-based System 8000
superminis give you a proven way to
quickly port your minicomputer
software onto affordable micros. For
instance, we offer compatible migra-
tion tools for Basic Four, Pascal, C,
DIBOL, and DC Micro.

GBA
micro
System
Corporation
San Jose, CA



SOFTWARE & SERVICES

Software, supplier choices critical to success

By Ray Diconelli
Special to CWI

Every year, software companies offering a variety of new systems enter the market. A few have become giants. Others have quietly disappeared. For those who are thinking of investing in computer systems applications for their operations, the

Diconelli is vice-president of the Manufacturing Systems Division of Management Science America, Inc.

health and survival of the software supplier they choose should be of fundamental importance.

Choosing the right software and software supplier is more critical, in many ways, than choosing the right computer hardware. The ramifications of the software choice will be felt every day in the operation of the company. The right choice is the most important step you will take in finding new solutions for old problems.

Following are some guidelines for decid-

ing what is the right choice for you:
What's the problem?

First things first: What is the problem you need to solve with your software? You will want to make a comprehensive assessment of your company's needs. Determine where software can assist you now, as well as later, by accounting for future growth.

In making this review of your company, you should look at precisely how you do
See CHASE page 80

| INDEX |
|------------------------------|
| Systems Software/74 |
| Productivity Aids/75 |
| Application Packages/76 |
| Remote Computing Services/78 |
| On-Line Data Bases/79 |
| Methodologies/79 |



SOFTLINE
Frank Sweet

Too many chiefs, one little Indian

Over coffee in the break room, a programmer/analyst tells the following sorrowful tale: "I've got seven people looking over my shoulder: one senior analyst, one project manager, a development center manager, an MIS director, two data base administrators and even the vice-president now and then. They all tell me that this system is 'critical' or 'vital' or 'politically important,' whatever that means. Well, if they're so worried I won't finish on time, how come nobody offers to pitch in and help me sling code? We have an army of chiefs breathing down my neck, but just one Indian doing the work — me."

See BROAD page 70

Sweet has 14 years of data base experience. Currently, he is corporate manager of data administration for the Charter Co. in Jacksonville, Fla. He is a regular contributor to Softline.

Enhanced Focus IMS/DC Interface offered by Information Builders

NEW YORK — Information Builders, Inc. has announced Release 2.2 of its Focus IMS/DC Interface, which permits users of the company's Focus data base management system to execute reporting and data analysis functions against IBM's IMS data bases and other existing files.

According to a spokesman, these functions include ad hoc queries, formatted reporting, graphics, statistical analysis and financial modeling. IBM's IMS/DC environment reportedly allows multiple users to access a single copy of Focus in memory.

The spokesman said Release 2.2 features a full screen editor that allows information to be changed, recalled and saved for later execution. External data bases, including IBM's Isam, Vsam, DL/I and Ocean; Cincom Systems, Inc.'s Total; Software AG of North America, Inc.'s Adabas; and Collinet Software, Inc.'s IDMS, can also be dynamically allocated.

The Focus IMS/DC Interface is priced at \$4,500 or can be leased for \$240 per month from Information Builders, 1250 Broadway, New York, N.Y. 10001.

NBS establishes software guideline

SPRINGFIELD, Va. — The National Bureau of Standards (NBS) has released its first official guideline for the validation, verification and testing of software. The guideline is contained in a new Federal Information Processing Standards (FIPS) publication that a staff member described as being a generic method for reducing the need to correct errors after software has been put into production.

The 37-page "Guideline for Life Cycle Validation, Verification and Testing of Computer Software" represents "the first time the total life cycle approach has been given [by NBS] as a framework for defining

validation, verification and testing procedures," said Dolores E. Wallace, a computer scientist in the Systems and Software Technology Division of the NBS Institute for Computer Sciences and Technology in Washington, D.C. The document emphasizes that validation, verification and testing should be done throughout the development life cycle.

The report is basically "a background that can be tailored to individual projects," Wallace said. It offers a way to schedule development activities so that they take place concurrently with validation.
See NBS page 80

DATA
BASE

Catalog Performance Optimizer (CPO)



Eliminate master catalog searches, reduce response time and CPU overhead automatically!

Call:
1-800-323-2000
412-323-2000

DUQUESNE
SYSTEMS INC.
Two Allegheny Ck.
Pittsburgh, PA 15212

VMSCHEDULE

VMSCHEDULE has reduced our prime-time workload by 30%.

VMSCHEDULE—A complete scheduling package for end users and management

- Optimizes machine use by running scheduled resource-intensive events during off-peak hours
- Saves systems personnel time by automatically running repetitive operations without intervention or initiation
- Automatically re-schedules events when the machine has been down
- Provides optional load balancing features
- Uses simple English sub-commands
- Allows concurrent operations by several users
- Increases security by verifying passwords
- Requires no mods to CP or RMS

703-821-8886

VM Software Inc.

Name _____
 Title _____ Company _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____ CPU _____
 2010 Chan Bridge Road Suite 355 Vienna Va 22180 1-COMX-8886

TUBES

Now you can touch one with another...and another...and another...

Ver. 1.3
Multiple CPU Support
NOW AVAILABLE

TUBES USERS!

- PF3 - REAL TIME USE
- PF4 - REAL TIME USE
- PF5 - LOGON / OFF
- PF6 - LOGON / OFF
- PF7 - LOGON / OFF
- PF8 - LOGON / OFF
- PF9 - LOGON / OFF
- PF10 - LOGON / OFF

Up to 12 Different Systems with the Touch of a PF Key

...Now That's a Switch.

With no "login/logout" or "reset/die" required and without "touching" when transferring across systems, the TUBES user accesses up to 12 different systems, one with another and another...and back again, all with one finger (PF key).

Each user has a unique, installation-defined MENU screen. It details all of the user-permitted facilities or systems. Each system is associated with a 1270 PF Key. When depressed, it immediately connects the user to the system.

It's like having a terminal for each system permanently linked to one of the entire facilities. TUBES also provides absolute access security. No Obligations TUBES Evaluation. To access your TUBES no obligation evaluation package, touch these ten keys: 800-223-0446. In NJ, 201-895-8886. Or clip your business card to a copy of this ad and send it to:

M macro4inc.
 Systems Software

Millbrook Plaza, Mt. Freedom, NJ 07970

MACRO-4 SPECIALISTS IN IBM SOFTWARE SINCE 1982
 One Product: SYSTEM ACCOUNTING • V-SAM TIME • LOGO/MAIL/LOGO • BOOST
 10 • IBM/CP/CLP/COMPACTOR ONLINE • CO/CP/CP/CP • CDS • CDS

SOFTWARE & SERVICES

Tell-A-Graf upgrade adjusts chart layout to display media

By Jeffrey Boster
 CW West Coast Bureau

ANAHEIM, Calif. — Integrated Software Systems Corp. (Inso) recently enhanced its Tell-A-Graf graphics package with a feature that is said to adjust automatically chart layouts to suit different display media.

At the same time, Inso also expanded support for the company's Daspia graphics system to include the recently announced AT&T 3850 supermini-computer line running under Unix System V.

Both announcements came during the fifth annual conference of the National Computer Graphics Association.

The ability to tailor automatically graphics designs to suit different output media is implemented in Inso's latest Tell-A-Graf release, Version 5.0, according to a spokesman.

Inso's chart reformatting feature, dubbed Layout Intelligence, reportedly relieves graphics makers of the task of choosing the right visual design and color combination.

Under Tell-A-Graf 5.0, users need only specify the type of medium in which they want their planned

charts to appear — slides, viewgraphs, CRT terminals, reports or microcomputers. Layout Intelligence then automatically designs, formats and colors the graphs in accordance with the designated medium's requirements, the spokesman said.

The latest Tell-A-Graf release also incorporates several other enhancements, including:

- A feature that provides chart makers with an unlimited color selection.

- A metafile retrieval capability that merges stored Tell-A-Graf and Daspia graphics to replace text or to form symbols and curves.

- Software refinements that support curve and area blanking and allow users to create high-low-close stock charts, error bars and other graphs.

Under Inso's support policy, Version 5.0 will be supplied to existing Tell-A-Graf users at no charge. The 3850-compatible version of Daspia will range in price from \$21,600 to \$48,000.

Shipments of the latest Daspia release will begin this July from Inso at 10505 Sorrento Valley Road, San Diego, Calif. 92121.

Geisco incorporates Adas, Telex feature into its Mark III service

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) has upgraded its Mark III Shared Applications Service, a time-sharing computing service, to include Asynchronous Dedicated Access Service (Adas), Intersystem file transfer and the capacity to dial out to send Telex Corp.'s Telex messages.

The dial-out-to-Telex feature reportedly allows computer-generated data to be sent to any business locations equipped with the Telex devices anywhere in the world. However, this capability requires arrangements to be made with an international record carrier — TET Telecommunications Corp. — for the Telex service.

Adas reportedly allows Mark III Shared Applications clients to generate a high volume of communications traffic from a single site, and it provides access to the General Electric

worldwide communications network via an intelligent multiplexer at the client's location.

Intersystem file transfers are accomplished via the Interface File Transfer Utility (Xfer), which permits companies to exchange large volumes of transactions.

The Xfer service is priced on the basis of the size of the data files transferred. Small files of 1K char. cost the sender \$1.20 and the receiver \$1. Large files (840K) cost the sender \$5.4 and the receiver \$4.4.

Adas is priced at a fixed monthly charge, ranging from \$2,400 to \$5,100. The cost of the dial-out-to-Telex service is priced at \$40/terminal connect hour (TCH) for prime time and \$20/TCH for nonprime time, plus an additional charge of 17 cents per 1,000 char.

Geisco is located at 401 N. Washington St., Rockville, Md. 20850.

Banks offered backup service

WAYNE, Pa. — Sungard Recovery Services, a division of Sundata Co., has announced a disaster recovery backup service for check processing operations at financial institutions.

Called Express Check, the service is offered jointly by Sungard and the First Tennessee Bank in Chattanooga, Tenn. Subscribers have access to multiple IBM 3800-36 document processors with item numbering/endorsing and microfilming abilities.

The 3800 processors can be controlled by subscribers from one of four Sungard Recovery Centers

through the use of IBM's Check Processing Control System or other 3800 software.

On-line communications is possible with Computern Cor. channel extenders, which are IBM Series/1-based processors with special software programs that allow remote systems to function as if they were attached locally.

Prices range from \$1,500 to \$2,400 per month.

Sungard, Two Glenhardt Corporate Center, 1255 Drummers Lane, Wayne, Pa. 19087.



While everybody was talking about it, Pilot did something about it.

Pilot Executive Software announces a new class of software: The first mainframe Executive Information System (EIS). Developed by managers for managers, Pilot's EIS provides "status access" and decision-making facilities never before available.

**FOR A DEMONSTRATION
OF THE FIRST
COMMERCIAL
AVAILABLE EIS, CALL
PILOT AT (617) 523-5355.**

Information filtering. Compression grids. Synthesis of internal

and external information. Plus automated CSF tracking. And the ability to access it all on an IBM PC without touching the keyboard. Call today for a demonstration. Once you've seen everything it can do, you'll understand what all the talk is about.

PILOT

EXECUTIVE
SOFTWARE
142 STATE STREET
SCITON, MASSACHUSETTS 01904

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

STERLING SOFTWARE
MARKETING, INC.
Compucon Release 4.4A

Sterling Software Marketing, Inc. has announced Release 4.4A of Compucon, a data and text file comparison utility for IBM's MVS/ESA, DOS/VSE and VM/CMS operating systems.

Compucon is a file comparison utility that facilitates systems modifications within these IBM operating systems, the vendor said. Release 4.4A is said to provide direct support for users of IBM's IMS-DL/1, Fastpath and CICS-DL/1 and On-Line Business Systems, Inc.'s OHS/Wyriter conversational text editing system and Innovation Data Processing, Inc.'s Innovation Access Method system.

The spokesman said Compucon can now process partitioned data sets or directory-embedded data sets, and it features an interface to IBM's Interactive System Productivity Facility that enables users to compare files, create test data and set general execution conditions.

Release 4.4A of Compucon is priced at \$8,000 for the MVS/ESA version and \$4,000 for both the DOS/VSE and VM/CMS versions.

Sterling Software Marketing, 1007 Seventh St., Sacramento, Calif. 95814.

INFOCRAFT, INC.
DE/3000II

Infocraft, Inc. has announced DE/3000II, a new version of its DE/3000 high-speed, high-volume data entry system for Hewlett-Packard Co.'s HP

3000.

According to a spokesman, DE/3000II is a replacement for a desktop data entry system. The system has standard edit checks such as batch balancing, cash totals, range checks, match checks, overpunch and skip fields.

DE/3000II consists of six programs — format, master, entry, verify, tables and reformat — that control data from the source document until it is released to the application program. An optional translation program is available for transmission to the host system. The format program provides for the creation and modification of formats.

The master program creates jobs and batches, default format and level links and tracks the status of batches. The entry and verify programs include over 40 operator functions for

efficient and accurate data entry. The tables program allows the user to validate data against an external table, and the reformat program automatically reformats large records into smaller ones, or it can reformat one record into multiple records.

DE/3000II is priced at \$7,000, including one-year maintenance.

Infocraft, 1755 Manhattan Beach Blvd., Manhattan Beach, Calif. 90264.

MACKINNEY SYSTEMS
CICS/Spooler Release 3.0

Mackinney Systems has announced Release 3.0 of its CICS/Spooler software for IBM mainframes under DOS/VSE, OS and MVS.

A spokesman said the system allows batch reports to be sent to terminal printers and also allows CICS applications to generate reports to be printed on batch printers. Release 3.0 enhancements include an improved user interface, a security system to limit access to reports, predefined route lists for automatic report distribution to multiple printers and the ability to stop and restart printers.

Other features of CICS/Spooler include the ability to print selected pages of a report and automatic print initiation for batch-spoiled reports, the spokesman said.

Release 3.0 of CICS/Spooler is priced at \$1,295. The software can also be leased for \$400 per year.

Mackinney Systems, P.O. Box 3704, Elm St., Fair Grove, Mo. 65645.

WESTINGHOUSE ELECTRIC
CORP.
West/CICS Interface

Westinghouse Electric Corp. has announced a software module for its West teleprocessing system that reportedly permits users to employ a variety of programs produced by independent software developers for IBM's CICS teleprocessing monitor.

Called the West/CICS Interface program, the module also allows West users to use on-line application programs written in command-level Cobol. CICS application source codes and maps are processed through the West translator instead of the CICS translator, according to a Westinghouse spokesman.

The West/CICS Interface program operates under DOS/VSE and other vendor-compatible operating systems. A 10-year program lease is priced at \$10,000.

Westinghouse Advanced Systems Technology, Management Systems Software, 777 Penn Center Blvd., Pittsburgh, Pa. 15235.

CJW MANAGEMENT
SYSTEMS, INC.
Conversion tool

CJW Management Systems, Inc. is now offering users of Management Assistance, Inc.'s Basic Four Program a conversion tool that allows Basic Four programs to run on Data General Corp.'s machines.

An IBM Basic Interpreter program is used to convert the programs, reportedly without alterations. Programs converted from Basic Four to DG systems have been benchmarked at twice their previous speed, the vendor claimed.

Converted programs reportedly run on every machine in the DG line and are said to be able to operate

Continued on page 76



Don't miss
"MICROS: AN MIS RESPONSIBILITY?"
Latest in a series of
videotaped updates, exclusively from DELTAK's Special Edition:
Computerworld Reports.

An unprecedented explosion of new microcomputer products is bursting into companies today. Should the MIS department try to defuse this boom, or find an alternate role to play? Will traditional concepts about MIS suddenly be blown away?

To learn how to cope with these issues before they overwhelm you, be sure to view "Micros: An MIS Responsibility?"—an insightful 30-minute video report produced by DELTAK and CW Communications. Featuring host John Garitz and a distinguished panel of industry experts.

But don't touch that dial, because next month's Report will focus on another critical MIS issue:

Successfully Merging Office Automation and Data Processing.

You'll also want to order "back issues" of previously released Reports, including:

- The Micro/Mainframe Link
- Integrated Business Software: Micro Tools for Management
- Managing the Communications Network
- Divestiture: Order on Information Management

Don't wait for the micro boom to backfire on you! Call DELTAK order entry at (812) 369-3000 and ask for Special Edition: "Micros: An MIS Responsibility?" in Canada, call (416) 678-9222.

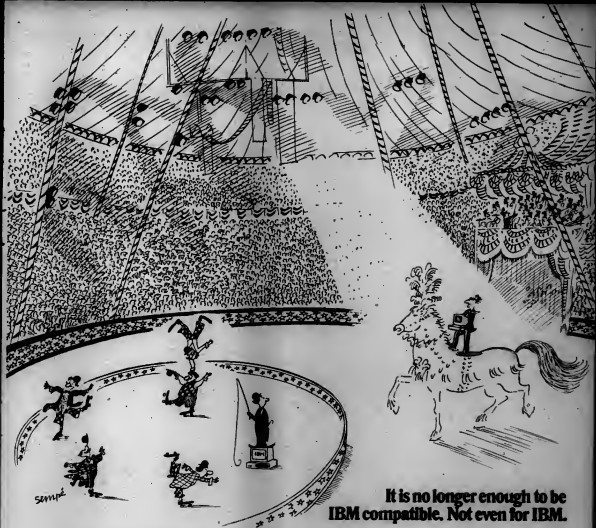


DELTAK
East/West Technological Center
1751 West Oak Rd., Naperville, IL 60566
(312) 369-3000 (800) 530-7986



CW Communications, a Division of
375 Concourse Road
Box 880, Framingham, MA 01701
(617) 879-0700

© 1984 DELTAK, INC.



**It is no longer enough to be
IBM compatible. Not even for IBM.**

It was the personal computer circus.

And it had gone on too long.

The crowd grew restless as each new act continued to perform varying degrees of IBM compatibility.

Suddenly, the crowd gasped. It was the unexpected finale—the arrival of Sperry, with a performance no one could have imagined possible.

Ladies and gentlemen, it was the Sperry PC. It ran IBM compatible software.

But that wasn't the show stopper.

Because it soon became quite clear the Sperry PC didn't just run the IBM programs, it ran them better.

Better because it ran them faster—up to 50% faster.

It ran them with breathtaking graphics, far more dramatic than the IBM PC could provide.

And it ran them from a keyboard that drew roars of approval, for it was not only easier to operate, but far more comfortable than IBM's.

And as the crowd cried out for more, that's just what Sperry gave them: the ability to plug right into a company's main computer, whether that system was IBM or Sperry. Or both.

As the crowd sat stunned by this final flourish, Sperry left all with a most provocative question. Was it possible

that the Sperry PC could do all of this and yet cost less?

Again, the crowd gasped.

Could it be?

Come see for yourself. Hands-on, side-by-side. Call 800-547-8362, toll-free. Or write us, Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

| SPERRY PERSONAL COMPUTER SPECIFICATIONS | |
|---|---|
| OPERATING SYSTEM | KEYBOARD |
| MS DOS Version 1.0 or 1.1 with G.W. | 30 keys, 1 L.C. card |
| BASIC MICRO-PROCESSOR | AUXILIARY MEMORY |
| High Speed 16-bit 8088 | Up to two internal 5 1/4" diskettes (10MB) |
| DISPLAY SCREENS | Internal Floppy disk when configured with single diskette |
| High Definition monochrome display | USER MEMORY |
| IBM compatible graphics | Standard 198K, 384K, expandable to 512K |
| COMMUNICATIONS | DIAGNOSTICS |
| Built-in Asynchronous | Personal and user |
| | CLOCK |
| | Time-of-day with battery back-up |

SPERRY



The Sperry PC.
What the personal computer should have been in the first place.

SOFTWARE & SERVICES

Continued from page 74

with the user's existing peripherals. Users may also directly access their DG operating systems when reconfiguring their systems, rather than needing to mail in Basic Four disk packs as before, the vendor said.

The conversion of Basic Four software is priced at \$3,500 for 30M- to 70M-byte machines. Prices in the DG line of computers offered by CJW Management Systems begin at \$30,000.

CJW Management Systems, 22 Middlesex Lane, Yonkers, N.Y. 10710.

COMPUTER TECHNIQUES, INC.

PI-Q4

Computer Techniques, Inc. has announced PI-Q4 for users of Prime Computer, Inc.'s processors.

According to a vendor spokesman, the PI-Q4 system enables users of Prime computers to access both the Prime operating system and the Prime Information data base management system files simultaneously. PI-Q4 is said to integrate both Prime and Prime Information environments into one program.

PI-Q4 is priced at \$4,500, the vendor said.

Computer Techniques, 1632 Main Ave., Olyphant, Pa. 18447.

DATABASE DESIGN, INC.

Data Designer for DOS/VSE

Database Design, Inc. has announced that its Data Designer software is now available for IBM's DOS/VSE operating system.

According to a spokeswoman, Data Designer is a logical data modeling tool that combines descriptions of individual user and application data requirements to produce a nonredundant, normalized, stable data base design. The design can reportedly then be implemented under any data base management system or file access method.

The shared data base designed under Data Designer reportedly eliminates the maintenance of redundant data and accommodates changing requirements with minimum reprogramming of existing applications. A perpetual license for Data Designer is priced at \$23,500, including training, one-year maintenance and installation.

Database Design, 2030 Hopbuck Road, Ann Arbor, Mich. 48104.

PRODUCTIVITY AIDS

VENTURA COMPUTER SYSTEMS

System Information Reporting

Ventura Computer Systems has announced a package of productivity tools for the IBM System/36.

The System Information Reporting (SIR) package contains 10 productivity tools, each of which is designed to aid in System/36 documentation, according to a vendor spokesman.

Two functions included in the SIR package reportedly provide quick access to the field reference file. Other commands enable quick retrieval of information such as file access paths, object descriptions, member data within a source file and member information of source files. Additional commands reportedly include a diagnostic-only compile generator and file/program usage cross-reference generators.

The SIR package is priced at \$1,000. Each of the tools is available individually at prices between \$50 and \$350.

Ventura Computer Systems, 1411 Kuehner Drive, Santa Susana, Calif. 91065.

APPLICATION PACKAGES

MANAGEMENT SCIENCE

AMERICA, INC.

Alltax2

Management Science America, Inc. (MSA) has introduced a new version of its Alltax tax computation software. Called Alltax2, the software reportedly permits users to make tax

changes without making a Cobol change or recompiling.

Alltax2 also reportedly changes the tax rate automatically on a user-specified date. Tax updates can be installed as they are received from MSA, and the system will determine when the changes will go into effect.

The Alltax2 system calculates multiple experience rates for an employer's state unemployment tax and handles daily, quarterly, semiannual, annual and other user-specified pay periods, a spokesman said.

The software is priced between \$2,500 and \$7,700. It operates on the following machines: IBM mainframe computers and plug-compatibles; Honeywell, Inc.'s Level 6 and large processors; Hewlett-Packard Co.'s HP 3000 series; NCR Corp. mainframes; Sperry Corp. mainframes;

Digital Equipment Corp. VAX-11 and PDP-11 models; and Burroughs Corp. large and medium-scale mainframes, the vendor said.

MSA, 2445 Peachtree Road N.E., Atlanta, Ga. 30326.

UCORL CORP.

Infopoint

Ucorl Corp. has announced an integrated banking software system for IBM mainframes.

Dubbed Infopoint, the system is said to address six operational and accounting areas within the banking industry, including depository processing, transaction processing, customer management, loans, general accounting and decision support. The Infopoint system consists of 10 applications that can be integrated or used

We didn't kill analog phones. Honest. Analog phones killed analog phones.

Because they required separate systems for data and voice. Because they required complicated access codes. Because they made the average office desk look like the average garage sale with speakers and autodialers and intercoms and coax footprints all over the place.



All ROLM has done is to introduce an entire family of phones that bring digital technology all the way to the desk. So, for the price of an analog phone you can have unheard-of communication power on standard telephone wire.

There's a \$100 ROLMphone® with single button commands, speed dialing,

SOFTWARE & SERVICES

separately, the vendor said.

Two major packages in the Info-point system are the On-line Returned/Exception Item application and the Teller application. The On-line Returned/Exception Item application is said to provide on-line access to account status and balance information.

The Teller application is a multi-institution, on-line system designed to improve customer service with more efficient teller terminal processing. The application provides a real-time link between the terminal and permanent customer account files.

Info-point operates under IBM's DOS and OS operating systems on IBM 4300 series and larger processors. The complete system is priced at \$800,000 and individual modules

are priced between \$30,000 and \$180,000, according to a spokesman for the vendor.

Ucoet, Ucoet Tower, Exchange Park, Dallas, Texas 75285.

STEEL HEDDLE Electronic Ticker File

Steel Heddle has announced an enhancement to its mainframe electronic mail package for IBM 3270 environments.

The enhancement to the Winrod Mail package, called the Electronic Ticker File, reportedly enables users to write reminder messages to themselves or others for display and printout at specific future dates and times. The message is automatically available for reading at that time, a vendor spokesman said.

Also, incoming mail can be rerouted to the Ticker file and mail being sent can include a ticker copy. All ticker messages dated for future delivery can be viewed at any time with no effect on the automatic display of future messages, the spokesman said. Electronic Ticker File is priced at \$595.

Steel Heddle, P.O. Box 1067, Greenville, S.C. 29602.

COGNOS, INC. Multiview/Powerplan Link

Cognos, Inc., formerly Quasar Systems Ltd., has announced a software link to connect its Multiview General Ledger financial software and Powerplan financial planning and graphics software for Hewlett-Packard Co.'s HP 3000 minicomputer.

The link is said to be automatic and bidirectional, providing main screen options for controlled transfer of financial information to and from Powerplan. The vendor said managers can use the link to build reports, budgets, forecasts and to access HP's Decision Support Graphics package.

Financial, budgetary and statistical information from Powerplan reports can be transferred to Multiview General Ledger and entered into general ledger systems through a new connection to Multiview's standard batch interface. All information that passes through the link is validated before the general ledger is updated, according to the vendor.

The link will be provided free of charge to Cognos clients until August 31, after which time the price will be \$2,000, according to the vendor.

Cognos, 1801 Oakland Blvd., Walnut Creek, Calif. 94596.

PROFESSIONAL SOFTWARE SUPPORT V-Plan Electronic Spreadsheet

Professional Software Support has announced the V-Plan Electronic Spreadsheet for users of Digital Equipment Corp.'s Decsystem-10 and 20 mainframes.

According to the vendor, V-Plan offers linked ordering of recalculation, a feature that keeps track of the spreadsheet cells affected or used by a calculation.

In addition, V-Plan reportedly gives users access to Decsystem-30's extended addressing virtual address space. The extended addressing feature of the spreadsheet is available to users with Decsystem Model 3080 utilizing DBC's Type-30 Release 5.1 operating system.

A single CPU license for V-Plan is priced at \$2,950.

Professional Software Support, 2115 Hale Drive, Burlingame, Calif. 94010.

FUSION PRODUCTS INTERNATIONAL Fusion/36 enhancements

Fusion Products International has announced a series of enhancements to its Fusion/36 Management Information Center software for the IBM System/36.

According to a spokesman, Fusion/36 has been enhanced to allow on-line displays to be windowed, creating a display up to 316 char. wide. The user reportedly can arrange the display so fields appear in any position and the display window may be moved horizontally to view the data.

In addition, the software also supports multiple data dictionaries, allowing a user to have an assigned data dictionary that describes the files and fields available to them. The Fusion/36 system is said to combine integrated information management, report writing, data dictionary, file maintenance and graphics capabilities, and it may be used with the company's Fusion/3 electronic spreadsheet system.

Fusion/36 is priced at \$3,800. **Fusion Products International, Suite 285, 900 Larkspur L.C., Larkspur, Calif. 94039.**

NEW GENERATION SOFTWARE, INC. Accession Payable

New Generation Software, Inc. has
Continued on page 78



voice volume control and an optional RS232 port for flawless, simultaneous data and voice transmission.

There are ROLMphones with more feature buttons, more lines, hands-free speakers and autodialers. There are ROLMphones that can tell you the caller's name, the extension number, the elapsed time of the call, the cost of the call.

Then there's Cypress.

Cypress is a super compact, smart ASCII terminal

and a totally integrated, full-featured digital phone.

The ROLMphones are simply the finishing touch to the most inevitable business communication system in the world today—the latest reason why more than two-thirds of the Fortune 500 companies choose ROLM.

If you'd like to see what a business phone system can do today, next year, into the next century, pick up that Plain Old Telephone and call ROLM.

ROLM

4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 95060 • 800-538-8154. (In Alaska, California and Hawaii, call 408-680-3025.)

SOFTWARE & SERVICES

Continued from page 77

announced, the Accounts Payable software for its Finance/28 product line, the second of five modules designed for the data base architecture of the IBM System/38.

The first module, Financial Reporting & Management, a financial information management system, was introduced in 1983. Other modules in the Finance/28 line will be available later this

year, the company said.

Features of Accounts Payable include: a report writer, security system, on-line inquiry ability, cash management functions, multi-department and multiuser capabilities and flexible cash requirements.

Accounts Payable is priced at \$9,500, the vendor said.

New Generation Software, 341 Lincoln St., Roseville, Calif. 95678.

REMOTE COMPUTING SERVICES

DIGITAL EQUIPMENT CORP.

Digital Software Information Network

Digital Equipment Corp. has announced a service tool that reportedly enables customers to access a data base

for information and solutions to software problems.

Called the Digital Software Information Network, the tool provides dial-up computer-aided service to DEC's U.S. customers. A modem is required.

The network provides customers with messages about critical software problems and their solutions, synopses of product information and a symptom/solution data base for correcting problems, ac-

cording to the vendor.

The service is available at no additional charge to customers with systems under warranty of a Decusport or Basic Support service contract.

DEC, 146 Main St., Maynard, Mass. 01754.

ON-LINE DATA BASES

ADP NETWORK SERVICES, INC. Banbury

ADP Network Services, Inc. has announced the Ban-corp data base of on-line banking industry data.

According to a vendor spokesman, Ban-corp contains consolidated and parent company financial data as well as subsidiary bank and stock market information on more than 1,600 U.S. bank holding companies. The data base is said to be useful for investment research, money management, merger and acquisition studies and credit and competitive analysis.

The spokesman said that much of the data in Ban-corp is derived from Y-9 Supplements, a report filed annually by bank holding companies with the U.S. Federal Reserve Board.

ADP makes Ban-corp available through its traditional remote computing services, through its ADP/Onsite service and through ADP's Datapath microcomputer access method.

Use of Ban-corp is transaction-priced — data items pulled from the data base, for example, are priced at 5 cents each — and requires no subscription fee, according to the vendor.

ADP Network Services, 175 Jackson Place, Ann Arbor, Mich. 48106.

MEAD DATA CENTRAL Exchange

Mead Data Central has Continued on page 79

Meeting all your information needs requires total systems integration knowledge and experience.



Meeting information needs has become a major international concern. One in which maintaining compatibility and unity is a difficult task. That's why Boeing Computer Services offers a unique combination of integrated information services to government and industry. To help you obtain precisely the systems, services and software you need.

For example, we design, implement and maintain large-scale communications networks — integrating the best technology without hardware bias. Our Office Information Services can help you at any stage in the office

automation process. With all-new or existing equipment.

We've also enhanced our MAINSTREAM® teleprocessing network to offer you today's leading operating systems and programming languages. No other remote computing firm gives you as many valuable options.

And we're linking microcomputers to our MAINSTREAM service in exciting new ways: workstations involving the IBM® PC/PC XT and XT/386, combined with our EIS® business management software. And our DP410 Micro Workstation for

structural engineers.

Finally, we provide a full range of Software Solutions. Complete Education & Training. And a variety of Professional Support Services.

In each area, Boeing offers you integrated solutions, designed to harmonize with your overall operation. For more information or the location of the sales office nearest you, call toll-free 800-447-4700.

Or write BOEING COMPUTER SERVICES, M.S. CV-26-11B, 7980 Galloway Court, Vienna, Va 22180.

BOEING COMPUTER SERVICES

A Division of The Boeing Company

MAINSTREAM and EIS are registered service marks of The Boeing Company • IBM is a registered trademark of International Business Machines.



"Mommy?"

SOFTWARE & SERVICES

INDIAN Continued from page 71

This individual has uncovered one of nature's eternal truths: Wherever you go, whatever you do, you'll find a host of managers and their staffs worriedly hovering over the one man who's actually doing the job.

Newspaper headline: "4th Infantry Brigade Advances." Actually, two of the brigade's three battalions are guarding the flank while one is advancing. But that one advancing battalion has one company holding headquarters, one in reserve and only one company, in fact, moving up. Of the moving-up company's three platoons, the first is digging in, the second is providing fire support and the third is advancing. This third platoon has two squads holding each flank where sister companies are, while only one squad is actually under way. The one moving squad is composed of two four-man fire teams. One is prone, covering the other. The second consists of four muddy, sleepless grunts slogging up a hill, hoping not to get shot at. "4th Infantry Brigade Advances" means those four.

TV newscaster: "Work is proceeding on the construction of the Francis River Bridge." Look closely at the film clip: Those three hard-hatted gentlemen in business suits are accountants; the two fellows carrying rolls of papers, engineers; and the two with clipboards, expeditors. Behind them all, obscured by the crowd, is a person in greasy coveralls, face hidden by a welder's mask, getting ready to strike an arc. That welder is the totality of "work proceeding."

Programmer/analysts work hours that would throw a union on strike. They're not invited to the meetings where decisions are made, yet they are held to the dates. They catch flak if the system is late and get to applaud the senior analyst's promotion if it's on time. They are the foot soldiers of our business and, yes indeed, are the ones who actually do the work while the rest of us hover over them, wringing our hands with worry. How do they put up with it?

Besta me.



"Computers, eh? Am I ever glad to see you!"

Continued from page 78 added Exchange, a financial data base, to its family of on-line services.

Exchange reportedly contains research reports written for some 1,600 companies by analysts at Merrill Lynch Pierce Fenner & Smith, Inc.; Paine Webber Mitchell Hutchins, Inc.; Piper, Jeffrey & Hopwood, Inc.; and Reuther Pierce Refines, Inc. Zacks Investment Research, Inc. reportedly sup-

plies consensus earning reports for the companies. The data base is said to include the full text of Securities and Exchange Commission filings for selected companies.

To utilize Exchange, users pay a monthly fee of \$60, \$30/hour connect time and an \$8/hour telecommunication charge, according to the vendor.

Head Data Central, P.O. Box 852, 5895 Springboro Pike, Dayton, Ohio 45401.

METHODOLOGIES

DATABASE DESIGN, INC. Information Planner for MVS

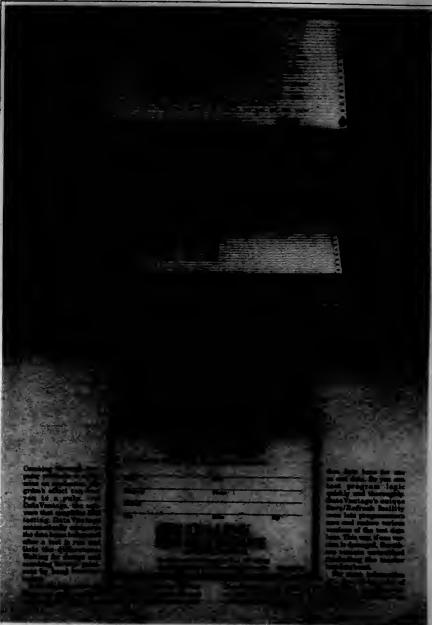
Database Design, Inc. has announced the release of an IBM MVS operating system version of its Information Planner software. The system is also available for Digital Equipment Corp.'s VAX-11 systems.

According to a spokesman

for the vendor, Information Planner automates strategic information systems planning methods, including IBM's Business System Planning, James Martin's Strategic Data Planning Methods and the Critical Success Factors approach.

The Information Planner system is said to provide an interactive, graphics-oriented user interface to a Planning Encyclopedia, which re-

Continued on page 80



SOFTWARE & SERVICES

Continued from page 79

cords basic business information, such as problems and goals, business functions and activities, information requirements, organizational and geographical structures and existing systems and data collections.

Analytic capabilities include consistency analysis, ad hoc inquiry and affinity analysis, according to the vendor.

The system is said to work in any IBM environment equipped with MVS, IBM's Interactive System Productivity Facility and IBM SP70-type terminals.

A perpetual license for Information Planner is priced at \$25,000, according to a spokesman for the vendor.

Database Design, 3280 Hopback Road, Ann Arbor, Mich. 48104.

NBS from page 71

tion, verification and testing procedures. The guide also shows how the output of one phase can be used for validation, verification and testing in the next phase.

In addition, the document presents three levels of recommendations for managing projects of varying degrees of complexity and importance. A representative validation, verification and testing plan is included as well as an example of the techniques as applied to an insurance application.

Called TIPS Publication 101, the guideline is available for \$8.50 from the U.S. Department of Commerce, National Technical Information Service, which is located at 5205 Port Royal Road, Springfield, Va. 22161.

CHOICE from page 71

what you do, step by step, from intake to delivery, whether you deal in services or in goods. From this review, you can determine where software applications can aid you.

Reviewing your assessment of needs, you should designate each possible application area as an essential, desirable or optional application of the software you will select.

Establish a software selection team

Early in the evaluation process, it is important to include key people who will be involved in and affected by the change in computer systems. A representative from each area should be appointed to a software selection team. The representative's input is important, for they will be

your main resource as to how a specific department functions, and by their participation, they become committed to the change.

The team should have decision-making powers sufficient to allow it to deal with the various vendors it will be considering.

The team's primary purpose is short-term: They are to define specific goals and objectives for the timely selection and implementation of the software.

Investigate software solutions

The first step here is to gather information. There are several ways to do this:

- Review software directories.
- Review listings in trade publications.
- Visit vendors at trade shows.
- Contact software vendors for overview information.
- Attend hardware users group sessions on software.
- Attend seminars conducted by software vendors.

Comparing vendors

Your selection team now should be ready to narrow the field of possible suppliers based on what you used and what is available.

You should determine which vendors best provide answers for your expressed needs. You should evaluate each on compatibility of software with hardware and the record of successful system implementations. You will want to know the availability and skill of the support staff the vendor maintains in your area. Will it be able to make the modifications or customizations that you might desire?

Most importantly, you will want to make a critical assessment of the financial stability and history of the vendor. Will it be there when you need it?

The next step should include a more detailed evaluation of top contenders. You may wish to issue a brief request for information. This is a good practice, as it forces you to articulate your requirements and prepares the vendor for his responsibilities.

Evaluating the cost of the package

Several factors affect the final cost of any software package. Most important are the level of sophistication of the application, the reliability of the product and the degree of support offered by the vendor.

The cost of support programs is sometimes included in the final cost of the package, though it is often figured separately.

In determining what it will cost to acquire an applications system, you should remember that software vendors don't actually sell their product to you: They lease or license its use for either a specified or unspecified period of time.

Making the decision

Up to this point, all your effort has been preliminary work. You earn the return on your investment of time and thoroughness at that point when you sit down to make the final decision on what software system best suits your company's needs.

If your preliminary work has been carefully accomplished, you should come to this decision confident in your ability to make the right choice. The choice, ultimately, is yours.

EasyPROCLIB gave me an extra half day a week! *



EasyPROCLIB is a unique operating system enhancement that proves that you can please all of the people all of the time.

If you're in charge of your data center's procedure library, it works for you by taking the responsibility for maintaining, controlling and repairing the system PROCLIBs off your shoulders, freeing up time to get other work done.

"We have over 800 users. It would be a nightmare to manage without EasyPROCLIB."

Users like it because it gives them control of their own PROCLIBs, and they can modify them any time without involving the systems staff.

And data center management likes it because it increases overall productivity. If a user crashes his private library, it doesn't affect the system or other users. An EasyPROCLIB diagnostic message notifies the user, and he is responsible for repairing or restoring it.

"What would it do if they told me I had to give up EasyPROCLIB? I'd fight them!"

There's no limit to the number of procedure libraries that may be established with EasyPROCLIB. There can be a private procedure library for each department, each development group, each programmer—for as many different divisions as you need. This means that you don't have to worry about deciding whether a procedure should be included in the installation procedure library—and users don't have to try to accomplish specific applications using less efficient general purpose procedures.

Because EasyPROCLIB is completely transparent, many users don't know that they have it. But the data center management and staff know—because it simplifies their job, cutting down housekeeping time and giving them more time to manage. Since it was introduced six years ago, Easy-

PROCLIB has been installed at hundreds of IBM MVS sites, and wherever it's been installed, it's still at work.

"We'll give you thirty days to see what EasyPROCLIB can do for you. FREE!"

You can try EasyPROCLIB in your own facility for thirty days on us. Installation takes about an hour of system programmer time and fifteen minutes of machine time.

For more information or to set up your free thirty-day trial, call today: 1-800-345-7555

458 Carlisle Drive
Bridgewater, NJ 08807
(703) 471-0468

Software Corporation of America

*Comments from interviews with EasyPROCLIB users.
*Comments from Software Corporation of America.
EasyPROCLIB for IBM MVS/ESA, MVS/SP/VP, MVS/SP/VS.

SPECIAL REPORT

Software productivity



Handling the application backlog

May 28, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMPANY

Legend holds true for fourth-generation tools

By George Schussel
and James Dewey
Special to C&EN

If you are interested in software, you have heard about fourth-generation languages. These tools are described as nonprocedural alternatives to traditional programming languages such as Cobol, Fortran and assembler. Folklore has it that fourth-generation languages can improve coding efficiency and timeliness by factors of five to 50. The folklore is true.

The precursors of today's fourth-generation languages were report generators and query languages. Using a report generator, a programmer or application user could create a standard report using five to 10 lines of code rather than the 400 to 500 lines it would take with a programming language such as Cobol. Using a query language, an application user could access information in a data base without writing a complex program.

The early report generators became more general-purpose and evolved into application generators, and these evolved further into very high-level programming languages. The functions of the query languages were extended beyond simple data base access and evolved into nonprocedural languages.

The efficiency of modern fourth-generation languages comes from their much higher level statements (specification of tasks rather than how to do those tasks), which result in many fewer lines of human code to do the same tasks as earlier languages.

Report writers first appeared in the 1960s, and query languages became widely used in the latter part of the 1970s. Today these early systems have evolved into diverse types of systems suitable for solving most programming tasks. There are several different categories of fourth-generation languages:

Schussel is president and Dewey is a senior research associate of Digital Consulting Associates, Inc., a consulting firm based in Andover, Mass.

Report writers first appeared in the 1960s, and query languages became widely used in the latter part of the 1970s. Today these early systems have evolved into diverse types of systems suitable for solving most programming tasks.

- Query and report languages.
- Fourth-generation programming languages.
- Information center tools.
- Cobol program generators.
- Decision support systems.

Principally designed for end users, these products are either menu driven or coded using very high-level, English-like statements that can search a file and produce a report or a query response. Most query languages allow diverse searching of data bases or files but do not allow updating of these files.

Artificial intelligence or free-form, English-like languages are in this category. Intellect by Artificial Intelligence Corp. (distributed by IBM and others) and Prolog are good examples of artificial intelligence languages.

Other query languages can make products that are inherently difficult to use available to managers or other support staff. Application Software, Inc.'s ASL/Inquiry and the various products from Informatics General Corp. (Mark V, Answer DB and so on) are good examples.

Sophisticated report writers that offer general systems-building capability, but that are not classified as true data base management systems (DBMS), could also be considered in this category. Multiplication, Inc.'s Inlog is a good example of a fourth-generation report writing tool.

Programming languages

These products are typically supplied by DBMS vendors and can be used in concert with the DBMS or against such files as Vasm or Isam. They are intended for use in the DP shop and are most productively used in generating screen-oriented, on-line programs. These products have mul-

tithreaded interfaces and are suitable for large-scale teleprocessing types of problems.

Typical of these products are Mantis from Cincom Systems, Inc., ADB/On-Line from Cullinet Software, Inc. and Ideal from Applied Data Research, Inc. They offer greatly improved programmer productivity over standard third-generation programming languages, because routine tasks are predefined.

Tools for screen development, report definition and data base description are included as part of the language, and the syntax encourages well-structured programming techniques. Simple tasks can be defined using simple statements, but users are unrestricted in their freedom to define complex control structures when they are needed to deal with complex tasks. These programming languages are not nonprocedural, and they require training and experience to be used most effectively.

Information center tools

Typically these are complete programming facilities with embedded DBMS, screen generators, statistics, graphics and links to various other DBMS packages. Products in this category have all of the tools necessary to perform even complex logic and have development languages that have a combination of nonprocedural, English-like statements and regular procedural logic. These systems are usually single-threaded for update processing and are not suitable for large teleprocessing environments.

Typical examples of these tools are Ramis II from Mathematics Products Group, Inc.; Focus from Information Builders, Inc.; and Nomad 2 from DAB Computing Services. These fe-

atures provide a more natural interface than a procedural programming language. These languages are also relatively easier to learn than Cobol and CICS, and users need not be concerned with control statements, loops or data base navigation.

The system selects the processing strategy, and performance depends on the ability of the system to optimize data base access and processing steps. If the application is too complex to be stated in the system's internal nonprocedural language, most of these products offer an internal procedural language or interfaces to standard third-generation languages. These languages are easy to learn and are well suited for nonprogrammer application users.

Cobol program generators

These products are similar to fourth-generation programming languages except that they are designed to live in a Cobol or PL/I world. This means that often they can be used in a maintenance environment against existing Cobol programs. Typically they are designed to work with Vasm files or a common third-generation DBMS such as IMS by IBM or Total by Cincom Systems, Inc.

This category is a good choice for the shop that has a lot invested in third-generation software technology and wants to move slowly into new techniques without making existing programming obsolete. Most Cobol program generators support IMS as Vasm file structures.

Some of the best examples of these products are IP/3 from Computing Productivity, Inc.; Telon from Christensen Systems, Inc.; and Pacbase from CGI Systems. An integrated access (which is not available from IBM) is normally supplied as part of a Cobol program generator.

Decision support system (DSS) tools are similar to information center tools. One principal difference, however, is that DSS are usually marketed to end users rather than to DPers. DSS also have embedded simulation languages that are suited to fi-

See FOURTH SR/6

INSIDE

T. Capes Jones on life without programmers/503

Fourth-generation tools mount a good offensive/504

Testing, debugging tool is fit with Tops/505

Development tool extends city's DP limits/507

Software engineering targets future concerns/509

Minicomputers — an endangered species?/512

Dial-up inquiry system helps firm's salesmen/513

Incomplete specs the villain in software production fix-ups/514

Packaged system stays the course for firm/516

Liberal exit grants team programmer post/517

Don't judge a programmer by expert alone/518

Buddy system helps new hires swim, not sink/519

Firm hits high seas in productivity quest/521

Only innovation can lead the backing tool/522

Software technology lagging behind hardware/524

System managers DOE radiation data/526

Micro help shift productivity focus/527

Software tool drives Jaguar's MIS effort/528

Problem-solving methods will see move to prototyping/529

Team approach mixes design, development, documentation/534

Application generators focus on data base/535

System launches time savings for Nasa/539

Don't blame structured programming/539

System boils up Hardee's DP operations/541

Development life cycle has 10 milestones/542

People skills extend DP effectiveness/543

Code maintenance stacks returns on modern investment/544

Secret to cutting backlog? Write less code/546

Prototyping gives users more enthusiasm/548

Tale of two languages: Mumps, RPG excel for different users/552

Software keeps Air Force jet engines roaring/555

DP development tool child's play at Carter's/555

Fourth-generation tool powers bank's assets/556

Development tool keeps account of bank's code/558

Program generator on shy in betting book/559

Exact info system gives quick access/560

User requests needn't be a pain in the neck/564

Alleviating prototyping concerns — the experience difference/566

T. Capers Jones on life without programmers

A look at reusable code, automated workstations and other alternatives

With programmer productivity becoming one of the hottest data processing topics of the 1980s, T. Capers Jones has stepped into the limelight. Jones, who recently joined Nolan, Norton & Co. as manager of the application management practice, has focused on productivity since 1967, when he started at IBM. He is the author of the highly regarded *Programming Productivity: Issues for the '80s*, which ranks as one of the 10 top-selling books published by the Institute of Electrical and Electronics Engineers. His new book, *Programming Productivity: Steps Toward a Science*, will be published by McGraw-Hill Publications Co. this fall.

For the past four years, Jones was assistant director of programming technology at the ITT Programming Technology Center in Stratford, Conn. There he was charged with introducing productivity methods into the major communications companies. Jones was interviewed at Nolan, Norton headquarters in Lexington, Mass., by Computerworld Senior Editor/Software Paul O'Brien.

Q There's been a lot of talk for the last several years about programming without programmers. How close are we to that as a reality?

The whole topic of alternatives to programming covers a lot of ground: application generators, very high-level languages, libraries of reusable code and, in some cases, functions integrating into [very large-scale integration] or microcode. My view is that the technology that is probably ahead at the moment is libraries of standard functions and reusable code.

There are [large] companies today that are developing new applications with over half of the functions coming from libraries of standard code. They're finding productivity rates of 24,000 to 26,000 lines of code per man-year, but over half of that is borrowed from a library of standard functions. I predict that by the end of the century, probably half the code delivered will come from some reusable source.

Q Reusable code, I think, is not as terribly well understood. How do you define it?

Actually, reusable code, application generators and fourth-generation languages are variations on a

common theme. The essence of the variation is that many things in programming have been done many, many times before. There's no need to reinvent common algorithms.

The variation is in the access method for getting hold of that common function. In reusable code, the selection is done by a live person selecting from a library and linking it. In an application generator, the same function is hidden in the generator. You simply describe questions about your application, and the generator logic selects the function from its source.

With very high-level languages, you're getting an increasingly powerful repertoire of standard functions embedded in the language in the compiler and on-line access to those functions by means of commands.

Q Why has reusable code not come out commercially?

There's a time span from the moment a new technology is invented until it reaches commercial acceptance. For example, it took many years for rifles to replace musket-loading muskets in the military.

There are also some cost elements and business factors that need to be solved before the technical problems can be addressed. Reusable code requires a little more time and a slightly more rigorous development process than just developing a customized piece of code.

One of the business problems is that the person that first develops the code gets no benefit at all. It's the users that come after that get the benefit. Unless companies can provide some kind of incentive to convince developers to do code in a reusable fashion, plus pay the overhead costs of managing the library and stocking the functional catalog, there's no incentive to do it in the first place.

Q Why not just take modules out of applications that are being written and build the library as you go along?

Attempts to do that generally have been unfortunate. One reason is that reusability has to be designed in. You need relatively constricted interfaces, and systems developed at random are not suitable for that. In fact, until structured programming methodologies become common, selecting code at random for reuse would not be a good choice because it would

probably be so poorly designed and structured that you would not want to reuse it.

Q What is the major barrier to mass productivity improvements in most ISF shops today?

I would say historical inertia and the fact that people are so busy that they don't have the time or leisure to reflect on ways of doing things better.

The companies that are setting records in productivity have put some substantial research efforts into it, and there were some fairly stable overhead costs before productivity gains were achieved. It may have taken three to five years to select the technology, stock the library and get it running.

Q In what area of the system development life cycle do you think productivity improvements could have the greatest benefit?

Coding productivity is coming under control, so there are two other areas that need to be explored. One is productivity in paperwork. For large systems, especially those written under government contract, perhaps half of the total cost is devoted to paperwork. There may be as many as 200 English words created for every line of source code. Some of these big systems generate over 100 different types of documents. Internal projects usually have smaller document sets, but you're still looking at 20 to 25 kinds of documents. The documentation report in many organizations is pitifully inadequate to handle that.

Documentation support systems are slowly starting to reach the marketplace. Skeleton outlines for common document types, hotplates built into the system and, more exciting to me, integrated text/graphics terminals [have the greatest potential to address the problem].

The next big area is the cost of defect removal, which for most internal projects is the most expensive activity.

The science of optimizing defect removal is starting to reach respectable proportions. It's now possible for a company to tailor a defect removal series of five to nine different kinds of inspections and tests that will get the highest possible combination of efficiency, low cost and short schedules.

Q Do you see a large market for workstations that automate design and documentation?

Companies that are beginning to market the right kinds of tools to the computing industry itself are going to have one of the biggest markets in world history. With the computing industry becoming one of the biggest in the world, the shortage of tools is starting to be understood.

Right now a programmer, even in a full development support environment, probably only has 10 to 16 tools available to him and a manager has less than five. By the end of the century, I expect 50 to 80 powerful tools will be available to the programmer and manager for the development and support of software projects.



Q What is the best way to measure productivity?

The hottest item in commercial software measurement is the function point method developed by Al Abrecht at IBM. That is an attempt to get outside the coding and to look at the external characteristics of software.

The function point method says let's forget about lines of code; let's try to measure the external characteristics of our software, that is, the number of inputs, the number of outputs, the number of master files and the number of inquiries. Some recent findings [in this area] are very revealing. For example, PL/I programs tend to average about 45 source statements per Abrecht function point. Cobol programs average about 166, whereas assembly language programs average over 300. So you can see that with PL/I, you have to write a smaller quantity of code than with Cobol.

Q Do you think Cobol is here to stay?

I think Cobol is to programming what the Qwerty keyboard is to typing. It isn't optimal, but so many thousands of people have been trained in it and so many tools support it, that it probably is here at least for the rest of the century. [However, it will be used less frequently.]

Q End-user computing was for a long time touted as the answer to the application backlog. Does it still look like the shining star it once was?

End-user computing [can provide] substantial improvements. In typical enterprises, there are a lot of simple queries and file interrogations that have been done in the past by programmers that probably will be off-loaded to end users. But users still can't develop an eight million- or 10 million-line production system.

However, I will speculate that by 1990, if you look at all the programs that are being created in industrial and commercial organizations, over a third of them will be done by users.

Q Do you see a major breakthrough coming in programmer productivity?

See JUNE 25/8

Fourth-generation tools mount a good offensive

By Shelia Paine
Special to CW

How large is your application backlog?

Surveys of DP shops around the world continue to come to the same conclusion: Application backlogs of two to three years are almost the rule. With large Fortune 500 users, backlogs of five to seven years are not uncommon.

Paine is a Kansas City, Mo.-based district sales manager for Cincom Systems, Inc.

And instead of improving, the gap between capability and demand gets worse each year — an annual shortfall of from 30% to 50%.

IBM studies indicated that 90% of users surveyed have an application backlog of 18 months or more. But if you ask end users, it's clear that this is only the tip of the iceberg. A study by MIT's Sloan School of Management indicated that and users have application needs that increase the above figures by a factor of 1.5. This invisible backlog consists of applications that users have not even bothered to request, knowing full well that they will be told to get in line with all the others.

This situation is intolerable. Out of frustration, users turn to personal computers, stand-alone application computers and application systems that are often purchased without the involvement, or against the express wishes, of the data processing department. Multiple versions of data inevitably result, with concomitant security headaches.

The use of fourth-generation application development tools remains the best offense DP can mount against application backlogs and end-user frustration. However, you should tread carefully when implementing such tools in your shop, because application development tools are definitely not created equally.

For example, virtually any fourth-generation language will give you the ability to write good code faster. However, it will also give you the ability to write bad code faster. Obviously this is not a gain in productivity. Writing bad code faster simply makes your productivity problem worse.

Consider an analogous situation in the building trades industry. How do you compare the productivity of Carpenter A to that of Carpenter B? Suppose Carpenter A is a whiz with his hammer, driving in twice as many nails as Carpenter B over the same time period. Is Carpenter A, therefore, more productive?

The only useful way to measure productivity, whether you are talking about carpenters or programmers, is the good old bottom line. How long did it take? How much labor, materials and resources were required? Does the finished product actually perform the function for which it was designed? And, finally, how much maintenance is needed to keep it fully operational?

The bottom line is where it counts. Fourth-generation application development tools should be evaluated in terms of quantifiable results, not simply lines of code. If you really want to have a positive impact on productivity in your shop, ask yourself the following questions when you evaluate fourth-generation application development tools:

■ Will the tool give you productivity in the production center as well as in the development center and the information center?

To meet the full spectrum of needs of all end users, the tool should offer both nonprocedural functions and the power of a procedural language. This kind of flexibility allows you to develop and use simple applications as well as complex business or scientific applications. This kind of tool operates equally well whether it is used in the production center, the development center or the information center.

■ Is the tool efficient? If the tool is to be widely used, it must provide you with execution performance figures no greater than 2:1 compared with Cobol. Even though compiling power keeps getting cheaper, a language that consumes four to five times the normal equipment resource is too expensive and offers unacceptable terminal response times.

See LHM 38/6



Using lines of code as a measure of productivity is like judging carpenters on their ability to drive in nails quickly. The best measure of productivity is the bottom line results.

TELLAPLAN™ MAKES EASY AS

Now, anyone in any department can easily manage projects and events. And they can graphically communicate results to top management.

How? With TELLAPLAN™ software from ISSCO.

Thanks to TELLAPLAN, you don't need to know elaborate planning techniques or computer programming. Using simple English commands, you can build

detailed plans, set time schedules, figure labor loading and compute budgets. You can quickly make updates, add new tasks and adjust timing, too.

Complete planning capability.

TELLAPLAN works with ISSCO's

TELL-A-GRAF® graphics software.

Together they produce a wide variety of Gantt charts that combine features of PERT and CPM with Gantt simplicity.

You can see planned, actual and estimated start and end dates, as well as critical paths, task dependencies and slack. In addition, TELLAPLAN produces more than 50 resource and cost reporting charts directly from the planning data.

TELLAPLAN also lets you do "What if?" analysis. It automatically computes critical paths between tasks every

Testing, debugging tool a hit with Topps

Pinpoints problems quickly, reduces system downtime

BROOKLYN, N.Y. — For the maker of Baseball bubble gum, debugging Cobol programs directly from CICS was as much a hindrance as is removing sticky bubble gum from a child's face. Topps Chewing Gum, Inc. here, ranking as one of the largest manufacturers of chewing gum, confectionary products and baseball cards, needed an approach to increase programmer productivity.

With sales of about \$70 million, Topps has computer operations that reach into every aspect of the compe-

ny's business. Using an IBM 4331 computer running under DOS/VSE, the Topps DP center supports an array of applications for manufacturing, shipping, accounting and personnel. Maintaining and expanding these applications placed an increased demand on the programming staff for more Cobol programs.

After examining ways to facilitate the programming effort, the DP center management concluded that the most cost-effective approach for increasing productivity was to incorporate software sophisticated enough to test and debug Cobol programs directly from CICS. After looking at many products, Topps selected CA-Test/CICS from Computer Associates International, Inc.

Dave Flehman, manager of systems and programming for Topps, explained, "We needed a quick way to pinpoint the bugs that occurred in the Cobol code. Because of the growing complexity of our programs, it became increasingly difficult to isolate and define problems. We also needed a way to facilitate the detailed testing that is required for all of our programs."

"We use Panesco Systems, Inc.'s MIS/OL for Cobol program development and find it very effective," he said. "However, it is limited in its usefulness in testing and debugging

Cobol programs, because it can only detect errors that occur in an MIS/OL function. If the problem originated in any Cobol command-level code that we have written, MIS/OL is powerless to isolate it. "It was CA-Test/CICS' ability to interface with MIS/OL that made it stand out from the other products we looked at. It was the only product that was adaptable enough to work with MIS/OL."

Ivan Dixon, a programmer/analyst for Topps, described how he works: "The Cobol programs are compiled under CA-Test/CICS. If CA-Test/CICS detects an error during program execution, it interrupts the error and stops the program immediately."

"It then provides us with a snapshot of all program components, including the program itself, any screens used by the program during execution, all of our work areas, all of our storage areas and the like. We can then locate and fix whatever errors occurred and let the program continue running."



"CA-Test/CICS ride as if having to go through the tasks usually associated with testing Cobol. We no longer have to execute the program, wait for it to abort, wait for a hex dump, wade through reams of paper searching for the problem, finally fix the problem and restart the cycle all over again, hoping that it works correctly the next time."

A CA-Test/CICS facility protects Topps' CICS production environment from corruption with test transactions. "Before we had CA-Test/CICS," Dixon said, "we used to bring CICS down about three to four times a week. ... CA-Test took care of that problem as well."



MANAGING PROJECTS A, B, SEE.

time a plan is updated. And it calculates current earned value.

Best of all, when you're ready to share your data with others, TELLAPLAN's bold, clear graphics ensure that your presentation will look professional and be easily understood.

Free project management guide.

Let ISSCO show you how TELLAPLAN can work with your company's

mainframe or 32-bit minicomputers.

To receive a free copy of our booklet, "How to Plan Projects and Keep Them on Schedule," call (619) 452-0170. Or write to ISSCO, 10505 Sorrento Valley Road, San Diego, CA 92121. We'll help you make managing projects easy as A, B, See.

**DRAW FASTER CONCLUSIONS
WITH ISSCO.**

ISSCO
GRAPHICS SOFTWARE

SPECIAL REPORT

FOURTH from 29/2

ness modeling problems. Since test data bases are frequently required in the DBS environment, a simple, easy-to-define and easy-to-use data base definition language is a requirement.

Some DBS products are designed for the mainframe environment. Good examples are System W from Comshare, Inc., DPG from Encuscom Systems Corp., and Express from Management Decision Systems, Inc.

Most current users of DBS-type software, however, use microcomputer software. The most common micro software is the ubiquitous spreadsheet, such as Visicalc from VisiCorp or Multiplan from Microsoft, Inc. Integrated software packages such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's recently an-

nounced Framework will certainly sell hundreds of thousands of copies. Mainframe vendors are also moving into the micro DBS world with products such as CA-Execut from Computer Associates International, Inc. and Decision Support Software from Colisoft.

Choosing fourth-generation languages

The correct type of fourth-generation language to use for the development of an application depends on the class of application being developed, the experience of the people developing it, the workplace hardware environment and the location of necessary data bases.

If production applications are developed by professional DP personnel to perform the day-to-day DP tasks needed to run a business. This

is the data that is needed by the organization to perform its basic functions. These are systems like payroll, accounts receivable and payable, order processing and so on.

The majority of production applications is still being developed using third-generation programming languages. In some cases, where program size and performance are very important, even second-generation assembly languages are being used. This will continue to be the case where the development cost is spread over a very large number of users or over a long period of time.

For most new application development, however, high-level programming languages should be used. They enable new programmers to develop more complex applications, and they shorten the development time needed

to implement new applications. Fourth-generation programming languages and Cobol program generators are the appropriate fourth-generation language tools for these types of applications.

If management information systems are defined by application users and developed by professional DP personnel, then the development user generates the information needed to control and manage the operation of the organization. These are systems like personnel, general ledger, production scheduling and so forth.

For management information systems, the complexity of the problem and the degree of anticipated change will dictate the best tool. For very complex applications, very high-level programming languages in the hands of DP personnel will be needed. When the detail requirements cannot be defined and a great deal of change is anticipated, the use of non-procedural languages will allow application users to participate in development and can result in faster implementations and greater flexibility.

If these systems become too complex for the nonprocedural languages, they can then be redeveloped using a very high-level programming language. Query and report languages, information center tools or decision support systems might all be good candidates for software choices.

If Reporting and analysis systems are decision support systems developed by application users or user specialists to use production data, management information and public data to analyze data and generate reports used to make decisions about how to run an organization.

Reporting and analysis systems should be developed using nonprocedural languages such as query and report languages, information center tools or decision support systems. These systems are frequently changed, and application users should be involved in their development.

Even when these programs are not developed by the application user, he can read the nonprocedural language and figure out what changes should be made.

SYNAPSE A CLEAR ALTERNATIVE TO IBM AND TANDEN.

FOR THE BUSINESS TECHNOLOGIST WHO WANTS TO BUILD ONLINE DATABASE TRANSACTION PROCESSING SYSTEMS, SYNAPSE STARTED WITH A CLEAR SHEET OF PAPER—AND ENDED UP WITH THIS:

ACCELERATED AND ECONOMICAL APPLICATION DEVELOPMENT:

- Database concurrency, integrity and recovery are fully automated.
- Batch programming skills are adequate for development of online systems.
- Relational database navigation is completely independent from programs, and of data is independent of programs and screens.
- The application methodology and environment let users quickly translate their business requirements into online computer solutions.
- The communications system is powerful and terminal-independent.
- The system command language and batch facilities are unmatched in the industry.

APPLICATION AVAILABILITY AND INTEGRITY—KEY TO THE HIGHEST AVAILABLE FAULT TOLERANCE FOR THIS UNPRECEDENTED INTEGRATION OF SYSTEM-WIDE FAULT TOLERANCE:

- Application software integrity and recovery are achieved without any required application programming.
- Because of system maintenance tasks may be performed while the system is in production, the application is available 24 hours per day, 7 days per week.
- SYNAPSE IN-TIME architecture not only permits recovery from multiple processor failures, with no human intervention—but also lets all processors fully contribute to transaction throughput.
- Data integrity is the top system priority.

GRACEFUL GROWTH AND CONFINABLE PERFORMANCE:

- Performance increases linearly with the addition of processors online and under power, and yields the most transactions-per-second-per-dollar in the industry.
- The advanced Synapse multi-processor architecture expands system power linearly in low-cost increments, from superminis to largest mainframes, in one cabinet (42" wide).
- A unique software architecture automatically scales up with increasing database concurrency and growth.
- Relational database performance is achieved through access acceleration and an active system-wide APPLICATION DICTIONARY™ facility.
- Hardware and software growth is transparent to application programs and requires no application redesign, complex tuning or load balancing.
- Integration of the Transaction Processing Manager into the operating system eliminates bottlenecks traditionally found in systems dependent upon the requester-server model.

SIMPLICITY AND EFFICIENCY OF OPERATIONS:

- The system may be in production 24 hours per day, 7 days per week, because the following may be securely and efficiently done during production:
 - Backups - Database reorganization
 - Reconfiguration and growth
 - Maintenance - Development - Batch processing
- Program modules can perform in either a batch or an online environment.
- Menu-driven system security is flexible and easy-to-implement.
- Batch processing is flexible and high-performance.

What Synapse has created is a truly unique option. Totally integrated online database transaction processing—from hardware to software to application. With an architecture that combines 3081 performance, System/38 simplicity, Tandem availability, and a painless growth capability that's beyond anything else.

You can confirm all this for yourself in just a half day of one of our demonstration centers. You can walk in and build your own online database, screens and application unit. Then walk out with program listings and samples of output. Knowing that, while there's now an alternative to IBM and Tandem, there's clearly isn't one to Synapse.

Synapse
Computer Corporation
THINK ALIKE.

© 1984 Synapse Computer Corporation. Synapse™ is a registered trademark.
3081/38 is a trademark of Synapse Computer Corporation. System/38 is a trademark of International Business Machines Corporation.

Mail to: Synapse Computer Corporation
Corporate Communications Department
800 Buckeye Court, Milford, MA 02450-2031
(408) 548-1091

Please send me more information.
Please call me to schedule a demonstration.

| | | |
|---------|-------|------|
| Name | ____ | ____ |
| Company | ____ | ____ |
| Address | ____ | |
| City | State | Zip |

Call (408) 548-1091 for an invitation to see SDC technology exhibits. Or, please to attend the 3:30 pm Wednesday afternoon SDC "MULTI-PROCESSING SYSTOLIC" technical session, 7/28, where we will present a paper on our multiple-processor, shared-memory architecture.

JONES from page 3

I think there's one potential breakthrough. A really rigorous analysis of reusable code reveals that the functions can be reused. When that technology begins to coincide with parallel processors in which you can have (multiple) processors executing at once, applications will no longer be executed serially.

There are a couple of other emerging technology changes that are going to affect programming, but it's premature to say whether they'll improve productivity or cause new problems. One is the emerging availability of optical disks. Another thing that's just beginning to show up is iconographic images like the [Apple Computer, Inc.] Macintosh and Lisa, which are pictorial instead of character-string-based. There's no reason why executable languages couldn't be based on icons. I see the possibility of visual-based programming languages, maybe as early as 1990 to 1995, in which you have the ability to create executable programs from a pictorial design.

Development tool extends city's DP limits

LAKEWOOD, Colo. — For the four people who made up the data processing staff for this city, 1983 had one long, hot summer. This is the situation with which they had to contend:

■ Two small, aging, 8-bit multi-terabyte minicomputer systems, each running a dozen CRT terminals with critically poor response time and operating at — or beyond — maximum capacity.

■ A growing, unmet demand by the city's staff of 350 to 400 people for greater workstation access to computer resources and for new applications.

■ A proliferation of dedicated applications running on stand-alone personal computers that were not compatible with the central systems.

■ A primitive Parks and Recreation Department class registration system in which enrollment was done with paper and pencil and later entered into a batch system that produced only a few reports.

■ A police officer deployment system built around data entry screens that were equally cumbersome for users to operate and for programming to modify.

■ A vehicle fleet maintenance system run in batch mode, through the mail, by a service bureau 2,000 miles away.

■ A public safety (police) department master index system manually maintained on 8 by 8-in. cards stored in a huge mechanical filing unit affectionately referred to as Goddard.

■ A historic willingness by city government to undertake one-time capital expenditures, such as a larger, faster computer, coupled with a historic reluctance to commit to ongoing costs, such as additional application development staff.

Lakewood's DP staff made it through the summer, and then a 32-bit Bequei superminicomputer was ordered from Micro-data Corp. and installed in September. That system currently has 48 active asynchronous communications ports, with 40 now in use and workstations for the remaining eight scheduled to be acquired in the near future.

With computer resources in hand to serve a much larger

user base and with no new DP staff being considered, Lakewood looked for ways to increase development productivity with the existing staff — a DP director, a senior programmer/analyst, a programmer/analyst and an operator — and decided to evaluate application generators.

The DP staff prepared a list of necessary capabilities in any development system to be acquired: the ability to generate compilable source code; access to records from data entry screens by cross-referencing on descriptive tags; multi-part record keys; and the ability to deal with data stored in multiple subfields. It was determined that the system should be able to improve efficiency in every aspect of development and should be easy to learn, understand and use.

Initially, six development systems were considered. All ran under various implementations of the Fick & Associates, Inc. Pick operating system, one of which was supplied with the Bequei supermini. A first cut narrowed the field to three, and the final selection was The Programmer System (TPS), developed and marketed



by the Software Group, Inc., of Englewood, Colo. TPS was installed on the system here 2 1/2 months after hardware delivery.

"TPS did everything we wanted, and it's a very usable product," said Gary Brodoks, a senior programmer/analyst. "The manual provides good conceptual descriptions, and we can get the details from the on-line help feature. Also, [the Software Group] was willing to take the time to answer our questions, and that was very important to us."

Brodoks decided that the Parks and Recreation registration system was beyond enhancement and began fresh with TPS. "I used the documentation capabilities to build a complete user manual first," he said. "I showed that to Parks and Recreation

See LAKEWOOD 26/10



DOS/VS and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

- BIM-EDIT** — The editor with more than 25 significant features that ECP can't match.
- BIM-POOL** — Prints output in POWER/VS pooling queues on local or remote 3270 terminal printers. (Received ECP Million Dollar Award 1982).
- BIM-POOL** — On-line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER pooling queue.
- BIM-POD** — POWER Dynamic Queue performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.
- BIM-COB** — Comprehensive problem analysis and display of operational CICS systems.
- BIM-TEXT** — Word processing, document composition system. Creates formatted documents from fraction input.
- BIM-SWAP** — Switch local 3270 BITAM terminals between multiple CICS partitions without special hardware or additional ports.
- BIM-CPM** — CICS 3270 data composition system. Reduces response time for remote terminals significantly. Available for DOS/VSE and MVS also.
- BIM-3270** — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
- BIM-SDV** — On-line display of library directories and entries, VSAM Catalog entries, disk VTDC's, etc.
- BIM-BLOG** — Console Message File display. Used by computer operators and programmers.
- BIM-MONTR** — DOS/VS System Status, Performance Measurement, and POWER Queue display.
- BIM-DEV** — On-line Logical Unit assignments for physical devices, to resolve operational problems.
- BIM-SUBMIT** — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than \$500, highest \$4000. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly lease, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM

B I MOYLE ASSOCIATES, INC.
5786 Lincoln Drive
Minneapolis, MN 55426

612-833-2695
Telex 297 883 (BIM) US
Source: Information Computer Consultants Inc.

Source code control is only one step in software configuration management.

Softool's Change and Configuration Control (CCC™) takes you all the way to full configuration control

CCC automates: Management of changes and configurations, control over who makes what type of changes and where, tracking of trouble reports, reconstruction of previous versions, management reports, archiving, and all the remaining "steps" to total configuration control.

CCC is interactive and friendly. It supports all programming languages, and comes with on-line tutorials.

Available now! Over 1000 Softool products are installed worldwide.

CCC is supported on the DEC VAX, DG MKV, Gould B.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 3030X and 43XX computers.

There is more. CCC is a stand-alone component of SOFTOOL's X.

An Integrated Programming Environment (PE™) is also available.

If you want true configuration control, where all components of a given release can be managed as a unit, there is only one choice: CCC. Call for more details or a hands-on demonstration.

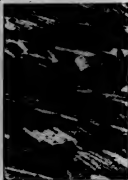
See us at: Design Group, May Day 84, Boston, Massachusetts, London.



Softool Corporation

240 S. Karlov Ave. • Goshute, California 92117
(805) 964-0000 • Telex 656334

SPECIAL REPORT



LINE

Is the tool usable by professionals and end users alike?

The language must be complex enough to meet the needs of the professional programmer, but at the same time it should be relatively easy to learn for large numbers of end users in all types of application development.

Further, it should be adaptable for personal and private computing to function as programmer workstations as well as traditional personal computers.

Does the tool support personal files as well as standard corporate data file structures?

While the tool should support its own files for personal computing, it must not be dependent upon, nor re-

quire, this kind of file support as a prerequisite. Standard Venn and data base management system support is imperative. Since new applications will be built primarily upon new data base and data structuring technology, the tool must be fully incorporable into these new technologies at the highest and most logical levels of support. The user must be able to exploit new technology as it arrives, without extensive and expensive conversions of existing systems.

Will the tool support new development technologies?

Prototyping and step-level refinement should be supported by the application development tool. In this way, you can achieve better interaction with the user during the design and testing stages of a project. These

development methodologies encourage end-user participation and result in better quality finished applications. A huge percentage of today's DP budget is expended on maintenance of existing applications. Most problems with applications occur, and could be fixed, during the requirements and design stages. Thus, it is critical that these methodologies be utilized to reduce errors during the early stages. Mistakes discovered during prototyping are much cheaper to remedy than those that appear when the application is in production.

Further, a tool that can be used in the production center, the development center and the information center allows you to move applications in a step-wise manner from prototype to production. Since the new tool is being used in all three areas, such movement does not involve major trauma or conversion headaches.

Is the tool integrated with your normal production environment?

A fully integrated application development tool provides you with the ability to use newly created applications that are integrated with existing applications written in another software language. Add-on application development side lock this important advantage.

Make sure that the tools you add to increase productivity are able to integrate with other tools in the production department. Fourth-generation tools need to fit into your environment and work with the security tools, monitors and so on that are already in place.

Will the tool integrate with decision support tools you may choose to add in the future?

A tool that is fully integrated with mainframe-based decision support tools — text editors, spreadsheets, graphics — will give you the opportunity to add more tools in the future as your needs require. Another important option is the ability to integrate your application development tool with a micro-mainframe link product, thereby giving end users the power and flexibility they need, while DP retains control of the data and standard security guidelines remain in effect.

Does the tool support multiple operating systems and hardware environments?

Look for a tool that operates independently of operating systems, communications monitors and hardware. Many organizations utilize different brands of hardware at different levels of the corporation. For example, an organization may use an IBM mainframe at the strategic level, where corporatewide decisions are made. At the same time, the organization may use Digital Equipment Corp. minicomputers at the divisional or tactical level and, say, Wang Laboratories, Inc. microcomputers at the local, or workstation, level. An application development tool should support all three levels.

If the answer to all these questions is "yes," you have an application development tool that can have a positive impact on reducing the application backlog if used properly.

The use of fourth-generation tools may not make your productivity problems go away overnight, but it can yield quantifiable results that will affect your data processing bottom line. More importantly, fourth-generation tools will affect your organization's bottom line as well.

For DOS/VSE Console Control

REMOTE BEATS LOCAL

FAQS/XP™ Console Control Shows To Be Convenient In Large And Small Shops.

Whether through CICS, MVS, VM, CDB or System R, FAQS/XP™ console control shows to be an extremely useful, flexible and easy-to-use system. It can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed.

RESPONSE TIME, THROUGHPUT DRAMATICALLY IMPROVED

FAQS/XP™ console control shows to be an extremely useful, flexible and easy-to-use system. It can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed.



WORKS WITH JOLMAN/XP

To control this level of console use, you need a system that can handle the volume of data and the complexity of the tasks. JOLMAN/XP is a system that can handle the volume of data and the complexity of the tasks. JOLMAN/XP is a system that can handle the volume of data and the complexity of the tasks.

Some Companies Operate CPU's In Other Shops with FAQS/XP™

Many of today's data centers use distributed processing. This means that the data is spread across multiple computers. This means that the data is spread across multiple computers. This means that the data is spread across multiple computers.

The multiple console control provided through CICS or CDB/VS can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed. It can be used to control any console-based application, including those that are not yet developed.

FAQS/XP is a practical system for any on-line installation. It is one of the most powerful systems for controlling console-based applications. For more information, call Geol Systems toll free today at 800-945-4545 (In Ohio 500-928-4545).



Geol Systems International, Inc.
6420 E. 8th Street
Columbus, Ohio 43234-1199
Phone (614) 880-1775

Software engineering targets future concerns

By Roger S. Pressman
Senior in Charge

During the 1970s, lagging industrial output and low product quality were collectively called a productivity crisis. In an effort to correct outmoded engineering and manufacturing techniques, many companies acquired computer-aided design and manufacturing (CAD/CAM) systems.

Pressman is president of R.S. Pressman and Associates, Inc., a consulting firm specializing in software engineering based in Orange, Conn.

CAD/CAM was widely adopted and is now seeing steady use.

Today, a new CAD/CAM is being proposed as one solution to what may refer to as a software crisis. This technology focuses on the design and manufacture of software — by engineering products of the 1980s and '90s — and is called computer-aided software engineering (CASE).

Case automates methods, controls and tools that are collectively applied throughout the software development process. By providing software project managers with control and tracking mechanisms, Case keeps development efforts on target. By enabling technical contributors to apply tools that assist in analysis, design, implementation and test, Case improves the quality of computer-based systems. Case is in its infancy, but practical elements of a comprehensive Case system are available today.

An analogy can be made between today's

Case and CAD/CAM of the early 1970s:

■ Everybody favors it philosophically, but few use it.

■ No comprehensive, integrated solution exists.

■ Systems focus on the wrong tools and often completely ignore the more important procedures.

■ Technical professionals are often unaware of available systems and are unfamiliar with methods for evaluation.

■ Smaller Case vendors, some of whom offer superior products, have difficulty overcoming a lack of name recognition.

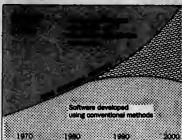
The demand for MIS and engineering software will continue to accelerate throughout the remainder of this century. The rate of growth of MIS software developed using conventional techniques is slowing. Software for engineering application areas will exhibit the same trend within five years. Computer-aided software engineering will be a major contributor to these trends.

As demands for software increase and

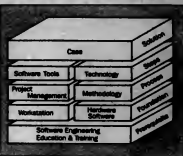
as requirements for quality and timeliness escalate, there is within the industry an increasing recognition of software engineering concepts. However, recognition and practical application do not necessarily go hand in hand. Many developers are groping for practical methods, reasonable procedures and effective tools to help them with the software development task.

With the exception of a small number of leading-edge software developers, software tools and associated programming environments are not used effectively. While all software

See CASE 51/12



The changing nature of software development



**Xerox,
World Bank,
State of Indiana
and
Reader's Digest
use our Computer
Personnel Tests...
Find out why
FREE**

Maybe it's because World Tests are in-depth and job related. Maybe it's because World Tests are validated and easy to administer. Whatever the reason, these organizations — and over 2,200 more around the world — rely on World Tests for making hiring & promotion decisions. In fact, over 300,000 data processing candidates have been tested with World Tests to select the best.

Developed by data processing professionals, World Tests are not merely multiple choice or short-answer tests. They actually measure job skills, assignments, in more accurately gauge candidate suitability. Plus, there is a wide range of World Tests to measure typewriting, proficiency and knowledge of both experienced and entry-level typewriters. Reliability, a detailed report with a 60 or 90 day recommendation is provided.

TRY US! FREE!

Find out for yourself why World Tests are so trusted. Take advantage of these introductory offers. We also offer an immediate 30-day service.

Free Trial Offer: Choose any one of these tests — test up to 500. Offer valid for first-time users with computer installation.

Free 30-day Examination Offer: Take 30 days to examine any of these tests. No obligation and absolutely free!

Priority Response Service: Results within 24 hours! Need to know about a candidate immediately? Try our super fast Priority Response Service and get results within 24 hours. A report will follow within a few days.

Don't see test?

CALL TOLL FREE (800) 361-0888 or
MAIL TO: Box 310, Oyster, NJ 07090

☐ Please send more information for test indicated

☐ Please send me one test indicated on my form

☐ Please send me one copy of each test indicated on my form

☐ I agree to abide by the terms & conditions of either the Trial or Free Examination OFFER

| Test | Amount | Test | Amount | Name | |
|---------------------|--------|----------------|--------|----------|--|
| WORLD CASH | \$55 | WORLD B.A.P.T. | \$55 | Title | |
| WORLD CASH | \$55 | WORLD TYPING | \$55 | Company | |
| WORLD P.L.T. | \$55 | WORLD TYPING | \$55 | Tel. () | |
| WORLD Accounting | \$55 | WORLD TYPING | \$55 | Address | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | City | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | State | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | Zip | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | | |
| WORLD INFO (20-101) | \$55 | WORLD TYPING | \$55 | | |

FREE TRIAL — SATISFACTION GUARANTEED — VALIDATED TESTS — FREE EXAMINATION

Ever wish there were about five more of you?

Multiply programmer productivity with the Programming Environment (PE™) from Softool.

With PE you compose substantial portions of an application program from prefabricated code, and produce finished products that are fully checked out, documented and standardized.

Many PROVEN tools. PE is an integrated set of proven software tools that literally multiplies programmer effectiveness. It is like having another programming staff... on-line! Tools available include: structured languages, source code auditor, source code documenter, interface documenter, error detectors, libraries of prefabricated code, testing aids, tracing aids, optimizers, flow analyzers, conversion tools... and much more.

PE is interactive and friendly. It provides a consistent user interface, plus on-line tutorials.

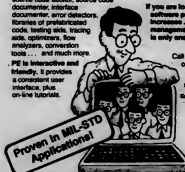
PE supports both FORTRAN and COBOL. Available now. Over 1000 Softool products are installed worldwide. PE is supported on the DEC VAX, DG MV, Gould S.E.I., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XK and ASIX computers.

There is more. PE is a stand-alone component of SOFTOOL®. A complete Change and Configuration Control Environment (CCC®) is also available.

If you are looking for true software productivity increases... and for management visibility, there is only one choice: SOFTOOL.

Call for more details or a hands-on demonstration.

See us at Dragon House, May 29-June 1, Kensington Gardens, London.



Softool Corporation
340 South Kellogg Avenue • Goleta, California 93117
(805) 964-0560 • Telex 658334

SPECIAL REPORT

Minicomputers — an endangered species?

Is the minicomputer the next vanishing species? At the end of a long, hot summer, *Computerworld's* August Special Report will take a look at minis and small business systems. We will look at minis in small businesses and at minis on the divisional levels of large corporations. Minis for turnkey systems and minis designed to penetrate specific vertical markets will be given a glance. There will be stories about minis used in distributed processing setups for general data processing and about dedicated minis

used for transaction processing.

The Special Report will also focus on whether the minicomputer is fading away at both ends, assailed by high-powered, multiuser microcomputers on the low end and by 32-bit superminicomputers at the high end.

Contributions to the Special Report should take one of two forms: a tutorial article discussing an issue or trend or a user application story outlining a particular firm's experience with a graphics system or package. Articles must be typed,

double-spaced and range in length from four to six pages. Artwork, such as charts, graphs and photographs, is encouraged.

Authors should include a brief biography and a telephone number at which they can be reached.

The deadline for submissions to the Special Report is June 27. If you have a story you would like to tell or any questions to ask, send them to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

LAKEWOOD from SR/7

people — it's a way of increasing user participation in development. With the Police and Recreation staff had made changes in the manual and finally approved it, TFS was used to build the system specified by the documentation.

The newly developed system interactively handles not only clinic enrollment, but also tracks participation of teams and leagues using the city's athletic fields and gymnasiums.

Svoboda also worked on the awkward police officer deployment system. "The Computer Aided Resource Deployment system maintains a data base of all incidents logged, tracking by address and amount of time required. Then it uses statistical methods to project the number of calls and the amount of time required to answer them for each best area.

"We generated data entry screens using TFS and made minor changes in existing programs so that they now use the TFS screen-handling external subroutines. The result is that everything is done in a standard way, and the whole system is easier to use and more efficient as a result."

Programmer/analyst Kip White used TFS to develop a criminal history tracking system to replace a manual system that relied on Federal Bureau of Investigation fingerprint forms and index cards. "With TFS, you still do the same things you did, but it's lightning fast by comparison. You go right from the screen to the finished program, and you can move things on the screen to change order of entry. You can modify a TFS program once it's built, but starting with a good structure with all the bases already covered helps."

Lakewood's criminal history data base currently receives about 1,000 new entries per month, and records go back to the city's founding 14 years ago.

Another instance of completely new development was the public safety department's master case index system. "This system tracks every occasion when any individual comes into contact with the police," Svoboda said.

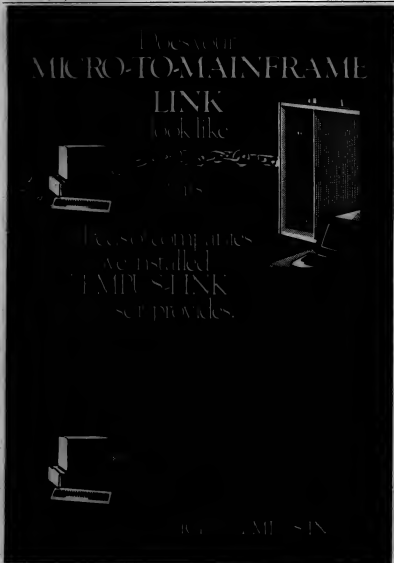
"In developing the system with TFS, we performed basically the same DP functions — but the way we did them and the time it took were very different. For instance, file creation is tied to the system documentation. That's significant to us."

Tony Mince, Lakewood's director of data processing, said, "It makes our ability to respond to users' needs much greater. It's nice to have a programmer using initiative to develop useful systems rather than writing the same old code over and over."

"TFS develops programs in a straightforward manner; it structures everything. The productivity of technical people is utilized with far greater efficiency."

"We're selling our product; we're going to the users and saying 'Here's our computer, here's what we can do for you.' We need to talk at any request. It's nice to have the user walk in and sit down and develop a long-term schedule with you and know you can do it or beat it."

Mince said, "It would be very difficult to go back to the [manual development] system. There's no way you could justify doing that. ... I don't think I could stand the pressure, I'd sooner leave the business."



Does your
MICRO-TO-MAINFRAME
LINK
look like
this?

Yes, so companies
we installed
TEMPU-SLINK
ser provides.

4,500 Users Said They'd Like Us To Put EASYTRIEVE On-Line...

We Gave Them All New, Powerful EASYTRIEVE PLUS



Tailored To Your
Expertise



Unmatched Flexibility
For The Information Center



No Other Product
On The Market
Compares



Powerful Solutions For
The Development Center



Incredibly Easy
To Use

Evolutionary EASYTRIEVE PLUS is the next generation in software technology, created in direct response to user enhancement requests. In one comprehensive package, EASYTRIEVE PLUS offers generalized information retrieval, data analysis, a query and application language, and on-line development capabilities under CMS, TSO, or CICS.

Like its well-known predecessor, EASYTRIEVE PLUS comes complete with the award-winning documentation, meticulous service, and user group support that made Pansophic the premier name in systems software.

Call us today for a demonstration...and introduce yourself to a software legend in its own time.



Completely
On-Line

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 966-6000.
In Canada, call (416) 272-0760.

SPECIAL REPORT

CASE from SR/9

developers make use of coding tools — compilers, editors, debuggers — the number of developers that are actively using tools for design, specification or test is estimated to be less than 40% of the software development population. In fact, probably fewer than 10% are actually using these tools in a systematic and integrated fashion. The reasons for this dismal record are:

■ **Tradition.** Many developers still write programs; in too many organizations the emphasis remains on source code.

■ **Insecurity.** Most software developers have had little training in new methodologies. Therefore, they are hesitant to incorporate new techniques into the software develop-

As demands for software increase, and as requirements for quality and timeliness escalate, there is within the industry an increasing recognition of software engineering concepts. However, recognition and practical application do not necessarily go hand in hand.

ment process and do not understand how tools associated with software engineering methods might best be used.

■ **Human factors.** Many tools that have been developed for software engineering applications are difficult to use. Rather than increase productivity and quality, these tools often in-

crease the level of frustration and are ultimately discarded.

■ **Management suspicion.** Many managers do not understand how software tools or Case can improve matters and have never had a quantitative benefit demonstrated.

The key attributes of Case exist within a structure. That structure

consists of education and training, used to introduce software engineering methodology; a Case workstation to provide a delivery vehicle for software tools; hardware/software support for system control functions, Case-based processor communications and networking; and finally, tools for project management and other software development tasks.

The entire Case system exhibits the following attributes:

■ **Integrated data base.** Case requires a data base that is capable of supporting integrated information and a variety of tools. That is, software development information, prepared at varying levels of detail, can be traced easily from level to level and translated from one tool to another.

■ **Individual tools must be modular and configurable.** — The user should be able to select only those tools that are amenable to a specific application area and still be able to obtain the benefits of Case.

■ **Documentation support.** Extensive documentation support must be provided. Manipulation of text and graphics should be facilitated by system features.

■ **Human interface.** The quality of a Case system will be measured by the quality of its human interface. All tools within the Case system should exhibit a consistent user interaction mechanism and should provide a natural mode of communication between the human and the machine.

The interaction mechanism must allow an expert user to get beyond preliminaries quickly while providing guidance to the novice. Both the interface and individual tools should apply computer graphics to assist in specification, design and test representation.

■ **Project management.** The Case system must automatically audit the process of software development. That is, Case project management software should serve as a harness for all tools and should monitor the activities associated with the use of each tool.

The Case system should record time spent on various software development tasks, track progress toward completion of project milestones and provide data for project tracking and control.

■ **Software tools.** Individual software engineering tools should be capable of adding the user in complex specification, design and analysis tasks, but should not be ponderous or complicated to use.

■ **Building blocks.** The Case system should provide mechanisms for creation and use of software building blocks. That is, software components that have generic applications should be cataloged and reused in other programs.

Case should encourage standardized module interfaces so that the building block approach can be realized.

■ **SQA and SCM.** Software quality assurance (SQA) and software configuration management (SCM) capabilities must be supported. Mechanisms for reviews, assessment of compliance to development standards and change control should all be available.

Rudimentary Case systems are emerging. No system available today offers a complete solution, but some Case products show considerable promise.

Relational alone doesn't cut it. Satisfying the needs of an information analyst takes more than just a pretty face.



SIR/DBMS delivers muscle...

A complete, relational database management system plus unique features to manage and analyze empirical, research, and decision-oriented data.

- Easy ad hoc query and reporting with SQL
- Fast, efficient programming with a fourth-generation language
- Unmatched portability across 20 mainframe, mini and micro systems
- Comprehensive data integrity and quality control
- Support of hierarchical, network, and relational views of data
- Direct interfaces with all major statistical software packages
- Flexible report generation, including camera-ready tabular displays

...for the most demanding brains

Since 1976 SIR, Inc. has pioneered the development of database software for information analysts. Market research analysts, statisticians, quality assurance engineers, medical researchers, environment specialists, and other data analysts use our system at installations of over 300 clients worldwide. A full range of technical support and training services is available to you.

Flex your muscles. Reach for SIR/DBMS.
Call or write: Director of Sales, SIR, Inc.,
820 Davis Street, Evanston, IL 60204

Meet us at
INFO/SOFTWARE
in Chicago
June 12-14

SIR/DBMS, a cut above relational
312-475-2314

SIR

Dial-up inquiry system helps firm's salesmen

WILMINGTON, Del. — Salesmen in the Films Division of ICI Americas, Inc. do not have to be standing next to a file cabinet in their headquarters to have instant access to important data. They can be in regional sales offices, in clients' offices, at home or in a hotel preparing for tomorrow's sales call.

In any case, they always have up-to-date information on order status and inventory because they have on-line inquiry into ICI Americas' central IBM 3081 computer through Texas Instruments, Inc. 707 Aacii teleprinters.

Prior to offering this 18-hour, toll-free, dial-up service, the Films Division could only supply its sales force with weekly hard-copy reports and the service of inside sales correspondents.

As one of the three major domestic suppliers of polyester film in the U.S., the Films Division operates in a highly competitive business environment. The division's Melinex films are used in computer supplies such as magnetic tapes, diskettes and cassette tapes and are sold for packaging, graphics, photography and a wide range of industrial applications. Serving 700 customers across the U.S., the Films Division is part of ICI Americas, a diversified chemical corporation and U.S. operating subsidiary of Imperial Chemical Industries PLC of London.

Diverse customers

"Because we deal with a diverse group of customers in a variety of markets and our products are available in a large number of grades, thicknesses, widths and lengths, each order is, in effect, custom-made," said Bruce Botmer, sales service manager of the Films Division.

"Before going on-line, we kept our sales force up-to-date with order status and inventory reports produced every Wednesday. It was Monday before the reports were received, however, which meant the data was four days old upon arrival; this was the information that had to be used for a week's worth of calls. Simply put, the data was stale."

The need for current information required the sales force to contact the Wilmington sales correspondents, who would provide updated status reports. "But this was time-consuming and nonproductive to the salesman and the sales correspondent and, perhaps, the client," said Chris Jording, assistant director of MIS. "On the average, each salesman was making about three telephone calls each day to the sales correspondents. Because the inside representative normally had to page through more than one report to answer the salesman's questions, each telephone conversation might last an hour."

Searching for alternatives to enable salesmen to access information quickly, the Films Division asked corporate MIS to review the situation and propose a solution that would be cost-effective and would not lead to data redundancy.

No need to change data

A senior business systems analyst from MIS traveled with various salesmen for two weeks to understand and analyze their problems. From this

trip, MIS determined that the Films Division needed a system that answered questions and printed hard copies of the report; there was no need to change data. In addition, the users would not have data processing training, so MIS would have to pre-program the inquiries.

First, MIS staff members decided to use Aacii teleprinters. Then they reviewed three software packages, which were already being used by ICI Americas, that could become the appropriate query systems. One was eliminated immediately because it was incompatible with Aacii hardware. At the end of the evaluation,

the Films Division selected the Inquiry Information Resource Management system from Infodata Systems, Inc. of Falls Church, Va.

"Simply put, Inquiry was selected because it is easy to use, easy to modify," Jording said. "Management in the Films Division explained what the sales force needed to see. We then created the prompts, as well as the Help commands, with Inquiry. As each inquiry was developed and approved, it was programmed into a library so that, with one command, the salesman could retrieve instructions for using that application."

"Every inquiry is driven with an

Inquiry macro; users only need enter customer numbers and their own security codes," he said. "We also were able to tie this new system in to the Films Division's existing data bases to eliminate the need for data entry."

Although the two systems analysts who designed this system were novices to Inquiry, the project was completed in two months.

"In that time, we evaluated the software, created the inquiries, made several modifications, demonstrated the system to all levels of management, completed a full set of documentation and received approval to order the teleprinters," Jording said.

What do top computer professionals usually say when we tell them about our unique, completely portable software?

"NO WAY!"

And actually we are not surprised. After all it took us 5 years to figure out how to do it. And now that we've gotten over that hurdle our biggest problem has been convincing people that Tominy's completely portable application development system really works.

Tominy allows you to develop completely portable application programs which can be used without modification on micros as well as mainframes and everything in between. That means no more costly and unproductive time spent in developing special systems to fit individual computers. With Tominy one size fits all.

We have such confidence in the system that we offer it with a 90 day no questions asked money back guarantee.

Because it is not possible to tell you here everything our portable application development system does, we have ready to send you a kit that not only offers detailed information on how the system operates but also shows how it is presently being used to increase productivity and reduce costs in over 1000 installations nationwide, including 25 of the Fortune 500 companies. It's yours free for the asking if you send in the coupon or call (513) 984-6605.

We are sure that after reading it Tominy will make a believer out of you too.

Tominy
Once is finally enough.

*Tominy's completely portable application development system is presently available for IBM's PC System/38, System/38, Series/1, AS/400, 308X, 370/XX, DEC VAX/VMS systems, UNIV and Xerox operating systems.

| | |
|---|-------|
| <input type="checkbox"/> I'd like to be convinced. Send me your information kit. <input type="checkbox"/> Have a representative call. | |
| NAME (PLEASE PRINT) | |
| TITLE | |
| COMPANY | |
| ADDRESS | |
| CITY | STATE |
| ZIP | |
| TELEPHONE | |
| Mail to: TOMINITY INC. Dept. B 4221 Melbsary Rd., Bld. #1 Cincinnati, Ohio 45242 | |

Incomplete, inaccurate specs the real villain

By Massimo Lampartello
Special to CWS

The backlog of user requirements common to many data processing shops is only one piece of evidence that points to the need for greater programmer productivity. The demands made on MIS divisions are great. Business such as rapidly changing priorities, old inflexible programs and programmer shortages are cited frequently to explain these backlogs to users and management.

While such items can and do contribute to software production problems, one of the biggest factors either is completely ignored or not recognized as the villain is it.

The lack of complete and correct specifications is the problem. All too often, project costs are estimated and completion dates are targeted before the goals and boundaries of a project are fully discussed. In the worst cases, work actually begins on program design or coding when the project is little more than a sketchy statement of a user's requirement.

One frequent result of working with incorrect specifications is, obviously, that the completed product will not do what people thought it would do. While this is an unpleasant situation, the ramifications are greater than first meets the eye.

It is safe to assume that the user will be unhappy. Users make a request, often wait a ridiculously long period of time for it to become a top priority and listen intently to reports of its progress. When enough work has been done to show something to the user, he is disappointed when the work does not meet his perceptions.

Technicians overlooked

There is another group frequently overlooked in such a scenario. The technicians responsible for the programming effort are frequently as annoyed as the user. Much thought and many days (or perhaps months) have been devoted to the project. Finding out at a rather late date that a project is not on course leads a programmer to think he has participated in a considerable amount of busywork.

After the revelation that the programs do not do what was intended, users, technicians and management frequently meet to salvage the project. They discuss more exact requirements, and programmers get busy adding lines of code or changing pre-

viously completed code to bring the project closer to the original target. More days or months pass, but at some point the user becomes satisfied with the results.

However, there lies another problem inherent in incorrect specifications. While additions or modifications are

In the worst cases, work actually begins . . . when the project is little more than a sketchy statement of a user's requirement.

made to a faulty application, full attention is focused on the users. The users are

pleased to see that programmers are devoted to their pet project. Such pleasure is,

however, short-lived. Often, it is at the completion of such a project that the users realize that other projects have been ignored. Time spent doing one project is time not spent doing other things. As obvious as this fact is, it is often overlooked in an atmosphere of crisis.

SIX REASONS WHY CINCOM'S MRPS IS THE SUPERIOR SOFTWARE SOLUTION TO YOUR MANUFACTURING CONTROL PROBLEMS.



Lampartello is an assistant vice-president of United Jersey Banks of Princeton, N.J.

in drama of software production tie-ups

Frequently, projects out there need doing but they are not defined enough to assign to a programming staff. As a result, one of three things happens. Programmers may work on other, equally important tasks. In a less desirable situation, programmers work on projects that are lower in priority. In the worst case, programmers work on nothing.

What steps can be taken in an attempt to make specifications more accurate and complete? As is often the case,

All too often, project costs are estimated and completion dates are targeted before the goals... of a project are fully discussed.

even in such a technical field as data processing, the key is people. Working with users

to define the scope and purpose of a project is a real skill. Unfortunately, this skill is not easily taught or quickly learned. It is far more simple a task to teach an individual basic programming skills.

While banking in the sun of the next successfully completed project, it would be worthwhile to identify those individuals who helped make the project a success. There are usually one or more key people who correctly interpreted user ideas and looked for answers to important questions before the issues became big problems. Such talent should be cultivated. Time is another key issue in solving the specification problem. It takes time to research user ideas and to transform them into usable specs.

Even when good people have spent sufficient time researching and planning a project, specifications may still be poor if decisions need to be made on outstanding questions.

Before technical work begins on a project, all parties involved should determine, document and agree to whatever requirements the project demands. These specifications should encompass all basic design plans. As the project evolves and new questions arise, the new questions should be answered, and the answers should be added to the original documentation.

Periodic reviews of this information by user and technical staff can ensure that the project is on track. All too often, though, documentation is left until the project is complete. There are two problems with this practice, however: the lack of written specifications may delay a project, and by the time the project is finished, those who were supposed to prepare the documentation are probably working on other things.

Admittedly, some specification shortcomings in an organization can be attributed to outside forces, such as changing, unclear government regulations. In many DP environments, however, there are internally created situations where specifications can be improved so that productivity can be improved. The phrase, "programmer shortage" may roll off the tongue easily, but the expression "specification shortage" is often more accurately the case.

1.

2.

3.

4.

5.

6.

IBM 1984

IBM 1984

Unparalleled Portability

Modular Growth Path

800-543-3010

- JCP open and share GDS files
- using both JCL
- many other COM/TECH functions
- alternate PAUSE statements
- free 30-day trial period
- \$1250 one-time or \$65 month

sdv
A Division of J.W. Linn, Inc.
8401 University Avenue N.E., Suite 308
Minneapolis, MN 55422
(612) 871-6552

Packaged system stays the course for firm

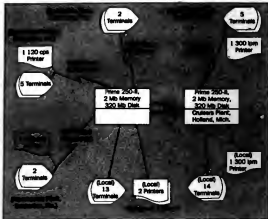
SARASOTA, Fla. — Murray Chris-Craft began considering a major upgrade of its data processing capabilities in 1981. At that time, its equipment consisted of an aging IBM 360/40, recently moved from a plant in Pompano Beach, Fla., to a site in Holland, Mich. Software applications consisted of a fairly wide range of manufacturing and accounting applications, although none of them were on-line.

It decided that an integrated, easily expanded system would be necessary in light of the expected growth of the company. That decision was a wise one, because corporate growth has, in fact, exceeded the original projections.

The U.S.'s oldest boat builder, manufacturing for the last 110 years, Murray Chris-Craft is now the nation's largest, with sales expected to top \$140 million this year and \$230 million next year.

Since most of the company's applications were reasonably standard, it decided to try to buy a packaged system and install modifications to a limited degree.

Touche Ross & Co., a Big Eight accounting firm that maintains a DP consulting operation, was already consulting for Chris-Craft. Help from Touche Ross would be invaluable if extended into the area of the selection of the new hardware and software. A detailed search began in



Chris-Craft DP configuration

June 1982. At the outset, the decision was made that no application appropriate to the organization should be automatically excluded, although it was appreciated that the overall implementation plan would take quite some time to execute. Applications that differed

from the norm, such as boat order entry and warranty handling, were identified for custom design. At this time, major modifications to existing systems were also specified.

The existing equipment was, by this point, installed and operating at the company's

crusier plant in Holland, Mich. The administrative offices, however, were located in Bradenton, Fla., and with no on-line facilities, this arrangement gave no scope for tight management control.

Chris-Craft currently operates six plants in five cities, employing approximately 1,500 people. At this time, the organization was operating, in addition to the corporate offices in Bradenton and the plant in Holland, one plant in Goshen, Ind., two more in Bradenton and plants in Evansboro, N.C., and Bellingham, Wash. The solution, therefore, would link these widely separated locations as tightly as possible while protecting the company from communications failures.

Bids were sought from several vendors, and in each case, the vendor was given free rein to configure the hardware and software in as applicable a way as the vendor's product permitted, within the overall guidelines of the request for proposals.

The configuration finally selected was a pair of identical CPUs from Prime Computer, Inc. The Model 250-8s were to be installed in Holland and Bradenton, linked by Prime's proprietary network software, PrimerNet, via a 9,600 bit/sec line. Goshen was installed as a satellite on the Holland machine, having terminals and a printer linked via a multi-line. See UP084E/30/20

Learn Lotus[®] by the book.

Electronic spreadsheets. Graphics. Databases. "What-if?" models. Lotus 1-2-3[™] really helps run the office, if you know how to run Lotus. We can help. "Putting 1-2-3 To Work" lets your fingers do the learning, using actual Lotus software. Your place. Your pace.

NTS. It took ten years of hard work to make learning this easy. Write or call today.

Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

Performance Aide:
Checklists for continuing quick reference.

Eight Application Examples on Diskette: For "hands-on" experience.

Self-Study Handbook: Instructional material in plain English. Not Computerese.

Self-Study Course: \$95

☐ Please send me _____ copies of the "Putting 1-2-3[™] To Work" self-study course @ \$95 each + \$3 each for shipping and handling. (California residents, add 6-1/2% sales tax.)

☐ My check or money order for \$_____ is enclosed.

☐ Please charge my credit card:

VISA/MC # _____

Exp. Date _____

Signature _____

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____ Zip _____

For information, call collect: (213) 394-7665.

(For our New York office, call collect: (212) 869-1730.)

CSMA

MSI NATIONAL TRAINING SYSTEMS, INC.

Los Angeles New York London

1111 Broadway, Santa Monica, CA 90401 (213) 394-7665

Liberal arts grads form programmer pool

Humanities, social sciences majors offer solution to high-tech's 'peopleware' problems

By Richard P. Johnson
Special to CWS

There is a vast, unacknowledged resource pool of talented people wandering in and out of the job market looking for the career opportunity they had hoped to find after college graduation. These people do not carry computer science diplomas. They carry diplomas that say English, psychology, history or sociology, to name a few.

Most of these people with bachelor's degrees in one of the humanities or social sciences are highly motivated individuals prepared for fields of employment that never materialized.

lies in closing the gap between the number of positions available and the number of people to fill them. Whatever success is found in applying the peopleware formula is welcome, but it alone is not enough. There will still be software to write and positions to fill.

The question becomes one of choice. Is it better to fill an empty programmer position with a degree, nontechnical person or not to fill it at all. Not filling empty positions can only add to the problem as well as undermine the effect of the peopleware formula. Some of the disadvantages in waiting to fill empty positions are:

■ Work overload for current staff.

■ Wasted time. Time spent waiting for the ideal person is lost. That time could be spent bringing a lesser qualified person up to speed. A creative manager will find ways to

make this person productive as he learns. Filling empty positions removes pressure from current staff members and has a positive effect on morale. Unless the position demands a highly specialized individual, anyone a manager hires starts out on a learning curve. When and if the ideal person is finally found, another lesser qualified person could already be a productive member of the staff, familiar with operations and well on the way toward adequate levels of technical competence.

■ Project completion delays. Not only do current project due dates slip out, but the resources to take on new projects diminish. Ultimately, this inhibits the shop's growth potential.

Filling programmer positions will help close the gap between positions available and people to fill them. This in turn will do a great deal toward stabilizing runaway turnover rates, salaries and replacement costs.

While this is not a suggestion to managers to become educators in the traditional sense, it is a suggestion to provide a learning environment for

certain candidates who meet some specific requirements and demonstrate an inclination toward programming. These requirements would include a four-year degree and at least six credits of computer science or equivalent experience.

Consider an educational development program where a company pays the way of an undergraduate student enrolled in a four-year degree program in computer science. The sponsoring company also pays the student for working part-time while not in school. The student is under an obligation to remain with the sponsoring company upon completion of his degree program. Since the student may or may not stay, the risk is obvious.

Taking this same idea and applying it to someone already possessing a four-year, nontechnical degree plus six to nine college credits in programming,

changes the part-time contribution to a full-time contribution, throws away the risk that the student may take his free education and go elsewhere and results in a much better sounding deal.

Trimming down the peopleware software budget is a desirable goal for all managers. The main reason for filling an empty programmer position with a person who holds nontechnical degrees should not be to save money. The main goal is still the highest level of quality for the lowest possible price. It is important to recognize that by filling an empty programmer position with a person who holds a nontechnical degree, a manager will not lose money. In fact, in many cases a manager can save money without sacrificing quality.

New hires with computer science degrees have two main advantages over new hires with nontechnical degrees. With a broader exposure to software development techniques, the new hire with the technical degree should be capable of designing software sooner.

These advantages, from a manager's point of view, lay his additional technical productivity summer. The key word here is "summer." Finding ways for new hires to be productive immediately will buy a manager additional technical productivity. This includes new hires with and without technical degrees. A programmer has many responsibilities, some more technical than others, some not technical at all.

Feeling some of the lesser technical responsibilities to new hires would accomplish three things:

■ Experienced programmers would have more time to concentrate



Salary progression

Needless to say, they are frustrated. Necessary to say, they are looking for a challenge and a chance to prove themselves. Many of them would like to make a career change into computer programming; some of them already have a few programming courses under their belts.

Is it economically feasible for a manager to fill a programmer position with a body carrying a nontechnical degree? The answer to this question might well be another question. Is it economically feasible not to? The cost of peopleware and software has risen dramatically over the past years, while the cost of hardware has decreased. Each year a manager can expect to see more and more of the data processing budget spent on people-related costs. Finding one to staff his shop is only a symptom of the problem. As the DP industry continues to grow and as programmer position availability increases, the turnover rate will continue to rise alongside salaries and replacement costs.

Today's managers are faced with the dilemma of having to slow down the rising cost of human resources, while at the same time meeting greater software demands. The strategy adopted by most managers to combat this dilemma utilizes a formula that goes something like this:

PROTECT INVESTMENT
IN PEOPLEWARE —
DECREASED TURNOVER +
DECREASED RECRUITING
COSTS +
INCREASED SOFTWARE
PRODUCTIVITY

The peopleware formula is practical and necessary but is limited in that it is a formula designed more to control than to remedy. The remedy



Technical learning curve

on technical problems of greater difficulty.

■ New hires with nontechnical degrees could be productive as they scaled the learning curve. Contributing to productivity is an excellent momentum builder and will help new hires assimilate more quickly.

■ Improved technical productivity would result.

Does a programmer with a nontechnical background have advantages? All things considered, the answer is yes. Traditionally, technical competence has received most of the emphasis, but technical competence is only one dimension of the successful programmer. An outline of four major competence groups follows:

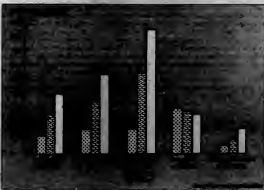
- Personal competence.
- Technical competence.
- Company-specific competence.
- Although technical competence is

a major component of the successful programmer, deficiency in any of the other competence areas decreases a programmer's effectiveness. Lacking any of these competences implies a learning curve.

There is no particular advantage for one degree type in terms of either personal competence or job-specific competence.

Inasmuch as the person with a technical degree has the advantage in the technical competence group, the nontechnical degree holder has the advantage in the communication competence group because of broader exposure to oral and written communication. This, of course, is the general rule; exceptions in either case exist.

There is an advantage in waiting for the ideal person to come along. Accepting the challenge to develop a lesser qualified person with potential will yield far better results than waiting. Viewing people with nontechnical degrees as possible solutions to the peopleware software problems of the 80s will prove beneficial.



Employment in DP occupations

Johnson is a software engineer for Texas Instruments, Inc. in Austin, Texas.

SPECIAL REPORT

Don't judge a programmer by expertise alone

By Richard P. Jelen
Special to CWS

Inasmuch as there is always a risk involved in hiring new programmers, it must be assumed that the risk is greater when hiring people with non-technical degrees. Just how much greater is a speculative question at this point, and until more people with non-technical degrees are tested, no accurate percentages can be offered. But based on what we know about successful programmers, we can develop a set of guidelines for selecting promising candidates with non-technical degrees.

The following list of attributes is

Beyond a minimum level of intelligence and technical knowledge, it is the personal characteristics of the individuals which differentiate good and poor performers on the job. Therefore, emphasis should be placed on these characteristics when recruiting and interviewing.

taken from a 1981 report titled "Individual Contributor Competencies in Software Development" by Maryann Fisher, then a doctoral intern at the University of Texas in Austin. The list identifies the 10 most important

attributes for success as rated by managers.

The most important attributes

- Willingness to accept responsibility.

- Thoroughness.
- Persistence against obstacles.
- Ability to be a self-starter.
- Ability to communicate.
- Resourcefulness.
- Responsibility to fulfill promises and commitments.
- Enjoyment of the work.
- Self-confidence and assuredness.

■ High standards.
What should be immediately apparent about the list is the absence of any reference to technical ability. However, because programming is a technical job, this attribute list assumes an adequate level of technical competence. Nevertheless, this list reveals that most attributes reflect personal characteristics. The report recommended that:

Beyond a minimum level of intelligence and technical knowledge, it is the personal characteristics of the individuals which differentiate good and poor performers on the job. Therefore, emphasis should be placed on these characteristics when recruiting and interviewing.

Based on two sets of interviews in this same study, the particular characteristics that emerged in the good performers showed that they:

- Seek challenges in their work.
- Feel that their work is important.
- Have high initiative.
- Are good problem solvers.
- Are open-minded.
- Keep current in the field.
- Are long-term planners.
- Have a high level of interaction with others.

These same traits are contained in the following set of guidelines by which to select promising candidates with non-technical degrees:

- A four-year degree. Success in a four-year program is a good indicator that an individual has the skills and the stick-to-it attitude needed to develop technical competence.
- Six to nine credits of programming or equivalent experience.
- A search for challenges in their work. Strong candidates enjoy working on problems that deal with the unfamiliar.
- The feeling that their work is important. How does the applicant feel about the job for which he is interviewing?
- High initiative. Has the applicant gone beyond the standard requirements of a resume or an application in terms of presenting himself?
- An ability for solving problems. How is the applicant solving the current problem of changing career fields? Has he designed a solution with a series of steps toward solving the problem?
- Open-mindedness. Is applicant interested in the suggestions the interviewer might have to offer?
- Currency in the field. Does the applicant read magazines to stay informed? Does he attend seminars? Read books?
- Long-term planning aptitude. Does the applicant know where he's going in a general sense? Has he thought about it?

MEET DATAPORT™

THE VITAL CONNECTION IN YOUR INFORMATION CENTER.

Imagine the potential of an information center tool that lets even the most novice of users work with data and spend it back and forth among leading micro and mainframe products.

STSC's DATAPORT product is that tool. With this versatile display and analysis product in your information center, there is virtually no piece of data beyond reach. DATAPORT's interfaces connect you to popular products like FOCUS®, RAMP®, dBASE®, dBASE II, APL/VS, dBase®, and LOTUS 1-2-3™.

To top it off, DATAPORT is a stand-alone, full-screen entry, display, and analysis system. Its file-folder concept allows users to work with tabular data like budgets or sales forecasts and text data like memos, instructions, or reports. The DATAPORT product also provides powerful calculation routines, highlighting, report formatting, and even works with multi-dimensional data.

Most important, DATAPORT was designed from the very beginning for the wide range of users in the information center environment. A unique combination of menu and command-driven technology provides a level of friendliness that satisfies the needs of both expert and novice users.

See for yourself how the DATAPORT product can be the vital link in your information center. For a free demonstration, write or call Margaret Traubach, STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852. (301) 964-5000.

STSC

STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852

Attention: Margaret Traubach

☐ Please send more information on STSC DATAPORT product.

☐ I'd like to schedule a DATAPORT demo. Please call to set a date.

Name _____

Title _____

Company _____

Address _____

Phone () _____

CW 5/84

DATAPORT is a trademark of STSC Corporation. FOCUS, RAMP, dBASE, and Lotus are registered trademarks of Information Systems, Inc., IBM Software, Inc., Software Systems Corporation, and MacIntyre respectively. dBASE is a registered service mark of dBase Systems, Inc. 1-2-3 is a trademark of Lotus Development Corporation.

John is a software engineer for Texas Instruments, Inc., in Austin, Texas.

SPECIAL REPORT

Buddy system helps new hires swim, not sink

In order to make the best use of the new programmer, especially one with a nontechnical degree, a manager must find ways to help him become productive immediately. A creative manager should be able to put together a list of tasks that vary in their degrees of technical difficulty.

Assigning responsibility immediately is a great way to bring out the best in a person. Some might call this the sink-or-swim theory. The new hire who has what it takes to be successful will not sink. The success, bound new hire in over his head will seek out the information he needs to get the job done. As long as the necessary resources are available and the new hire is aware of these resources, the sink-or-swim approach is a tough but fair test.

The manager must determine as soon as possible whether the risk taken in hiring a person was a good or a bad one. It is up to the manager to decide what task best suits the new hire's background and to allow him plenty of time to complete it. Speed will come with experience.

Hands-on participation

The concept of learning by experiencing, or hands-on participation, is nothing new. It exists to some degree in almost every job situation imaginable. Whether it is structured and formalized is a different matter. It suffices to say that any on-the-job training is better than none at all.

The best type of on-the-job training is the teaming of an experienced programmer with a nonexperienced programmer. The experienced programmer more or less becomes the mentor. He should be patient, knowledgeable and willing to accept the challenge of developing a new programmer into an asset, not only to the company, but to himself as well.

The new programmer should spend a large portion of his time alone working on a task for which he is personally responsible. When he reaches a snag, it is his responsibility to seek out the information he needs. There is nothing wrong with not knowing the answer. The ability to distinguish between wasting time and being independent is important.

Part of a new programmer's time will be spent with his mentor working out problems that go beyond his experience level. It will not take long before the experienced programmer and the new programmer understand each other's needs. By working together, they learn to be greater assets to one another.

Working with an experienced programmer will do more to develop a new programmer than any other single thing. As time goes on, the new programmer begins to contribute more and more to the team effort. In doing so, he becomes more independent, and his ability to handle larger portions of a project on his own increases.

A new hire can be productive as he ascends a learning curve. All shops are not the same, and it is up to the individual manager to come up with innovative ideas best suited to fulfilling his needs. A good way to find such ideas is to seek out ways to relieve pressure in other areas. New hires can be kept productive by doing:

Working with an experienced programmer will do more to develop a new programmer than any other single thing. As time goes on, the new programmer begins to contribute more . . . to the team effort.

■ **Code reading and flowcharting.** Taking a piece of code, reading it and then flowcharting it is a good way to learn the coding techniques of other experienced programmers. Programmers are not always familiar with the code they must debug. Picking up an unfamiliar piece of code to debug and flowcharting it can save valuable

time in a busy shop. It may even provide a way for the new hire and the more experienced programmer to work together.

■ **Team debugging.** A new hire can learn a great deal about software and hardware environments by assisting an experienced programmer in debugging a piece of code. The experi-

enced programmer can navigate by making the decisions and determining strategy; the new hire can start by examining listings and handling keyboard interactions.

■ **Code documentation.** Poorly documented code is a problem. A new hire can go in and add comments to undocumented code.

■ **Testing.** Much of the programmer's time is spent testing software. The new hire can run tests and possibly design and code them. This frees time for the experienced programmer, while providing another way for the new hire and the experienced programmer to work together.

INTELLECT

To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information career. INTELLECT's powerful information retrieval capabilities are so advanced that it understands

color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes. Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Whether you use INTELLECT as a natural system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____
HARDWARE TYPE _____ INFO CONTACT _____
DATE _____ SOURCE _____ INFO PRESENTATION _____

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Welham, MA 02254 0488

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Welham, MA 02254 617-890-8400

SPECIAL REPORT

UPGRADE from SR/16

planner and 9,600 MB/sec leased line. Bradenton similarly carried its two local plants via leased lines.

For software, an integrated system produced by Systems Management, Inc. (SMI) of Rosemont, Ill., was selected.

Dave Simmons, director of MIS, said, "We needed to get something in the area of a report writer, but also something that would allow management to do some projections, to perform some financial modeling, company modeling or capacity modeling."

An important part of the initial discussions addressed the cost of proposed modifications. The inclusion of the resulting specifications in the contracts did not wholly prevent later disagreements, but it did at least keep them at a manageable level. All too often, misunderstandings between the vendor and the customer have been known to lead to an unsuccessful implementation or, occasionally, material damage to one or both parties.

As an interim measure, Chris-Craft decided to transfer the accounting applications directly from the IBM to a service bureau near the administrative offices and leave a limited number of manufacturing subsystems on the Holland IBM system.

Sequence of implementation

At the time, consideration had already been given to planning the sequence of implementation. Implementation is a function of the nature of any given organization, and Chris-Craft's sequence was neither more nor less typical than any other. However, emphasis was, of course, placed on those departments where the most immediate need lay—either from the standpoint of efficiency or, in some cases, because of importance for management control.

Suitable rooms had been prepared, and the machines were delivered and installed in December 1982 and were operating the first few self-contained applications within two weeks.

The first major areas brought online were accounts payable, purchase orders and receipts processing. Since the purchase order system had been freshly modified and because of inexperience with this type of on-line software, some problems were encountered at first. Chris-Craft learned the lesson that all new users quickly face: Some desirable modifications were simply not worth the cost.

As a result, procedures had to be adjusted, although at no time any compromise was permitted to jeopardize the operation of a key department.

The next critical area to be addressed was the general ledger. The company's fiscal year ends in August, and as a result, it was planned to load the balances as of the beginning of the next fiscal year. Despite careful preparation, the task was a lengthy one.

The ledgers—one for each of the corporate entities in the organization—were processed at a local service bureau, and it was not feasible to transfer the data via tape or other automatic media. As a result, a large manual effort was involved, and it took several months for the on-line system to replace the bureau operation completely and also reflect cur-

rent activity. As soon as the general ledger was up to date, an immediate benefit accrued—the accounts payable and purchasing/receiving systems were interfaced to post automatically to the ledger.

There are currently six staff members involved directly in Chris-Craft's data processing, covering all locations. These provide training and support to the users, technical support for the machine and software and also leave some slack to provide a small amount of in-house software. Peter Kueper, DP manager, said, "I think the thing that excites me most is that our organization is known for rapid growth. In this context, our combination of hardware and software gives us an almost unlimited upgrade path

by the use of multiple CPUs in a network."

Acceptance by the user community has generally been very good. Employees have a positive attitude about their work, and this extends to the DP portion. At present, a relatively small number of people are directly involved, but as further systems are installed (inventory control, order entry, billing, accounts receivable, payroll and personnel), fast progress is expected toward a healthily automated operation.

Linda Pearson, accounts payable clerk, said, "Before we had this system, there was a lot of writing involved [to prepare data for the service bureau]. Now there is almost none. I feel that more planning and investigation would

have given us an even better system. More time spent discussing the system with the clerical staff involved might have avoided more problems. Nevertheless, a lot of improvements have been made—I think we are headed in the right direction."

Very shortly, Chris-Craft will double its hardware capacity and add further users, both within the present organization and also in other arms of the company as resources permit.

Simmons added, "The importance of preplanning cannot be overemphasized." Adopting a packaged approach (albeit with numerous modifications) gave Chris-Craft a fast start-up, a security blanket in the shape of the vendor and a cost proportionate to the complexity of its ambitions.



At long last, there is the business mind with the business system, effortlessly. Software so totally different and uniquely intelligent that it can create and carry through complex projects by itself. Extraordinary software with the capacity to adapt to a range of users' abilities, and grow in sophistication as their needs expand.

Introducing Smart Software from Innovative Software. There's never been a software system like it before. Nor is there anything else like it today.

That's because no other software has the capability to complete and repeat complex projects—from start to finish—on its own. Not by memorizing keystrokes (like a macro), but by adjusting to your project changes; and open-endedly performing dedicated applications:

Entire projects—spreadsheet to data base to graphics to word processing—can be completed without supervision; freeing your time for running your business, rather than running your business software.

In addition, Smart Software puts to rest, once and for all, the ease-of-use versus power dilemma, because this unprecedented software is as workable for beginners, as it is powerful for experts.



For more information on the fully-integrated Smart Software System, call 800-CRAFT-SMART or visit your local computer dealer for a demonstration.

Smart Software was created to work for you, relentlessly. Structured to integrate with its smart mates, automatically. And designed to communicate with not-so-smart software, brilliantly.

The one-of-a-kind Smart Software System. Undoubtedly the most productive tool ever conceived for the business mind.

INNOVATIVE
Software

The Smart Software System is currently available for the IBM PC, XT and compatibles. In Kansas, call 913-263-2899. © 1984 Innovative Software, Inc.

Firm hits rough seas in productivity quest

Murray Chris-Craft did not encounter smooth sailing all the way. There were some rough waters as it voyaged in productivity.

One problem that occurred was caused by the lack of a particular type of documentation. Some time earlier, the company had received the user guides for the entire vanilla portion of the system. However, these were only slightly more informative than the operational screens themselves. In particular, no information was supplied that identified exactly from what source an automatic general ledger posting came.

At month's end, it became difficult

One problem that occurred was caused by the lack of a particular type of documentation. No information was supplied that identified exactly from what source an automatic general ledger posting came.

to verify and balance the ledgers. This situation was rectified recently, when Systems Management, Inc. supplied a detailed description of all the automatic general ledger transactions produced by the system.

Chris-Craft's introduction of the production work order



system to the plant in Holland, Mich., was concurrent with the implementation of the general ledger system. Because of the nature of the product in the Holland plant (cruisers from 25 feet to 42 feet long), one boat can stay on the production line quite a long time. Too long, certainly,

to permit the issuance of all components at the same time. The importance of good inventory control and checkbooks that had to be met before it could be implemented delayed its planned implementation until the present.

A problem yet to be resolved concerns system breakdowns. The company currently backs up its data bases daily. (Software, which until very recently was an exact copy of that held by vendors, is backed up less often). Nevertheless, should there be a momentary power interruption, say, shortly before a backup, then the company is not in a good position to recover without restoring from tapes 24 hours old.

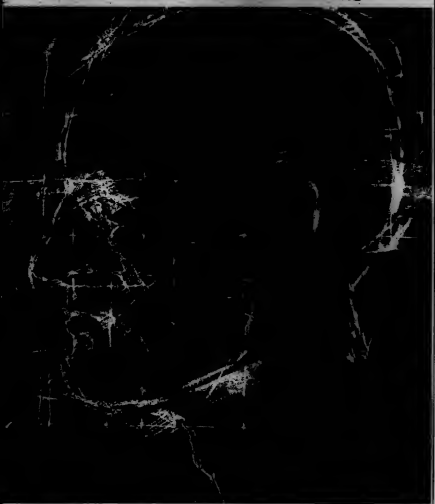
Thunderstorms common

In the Bradenton, Fla., area, such power problems are all too common during thunderstorms. The situation is aggravated by tight links in the application software — it is almost impossible to isolate a subsystem and restore that alone. Until recently, tedious inquiries on the data following power restoration would indicate what data, if any, had been lost. However, this will not be nearly as obvious when long-running batch programs affecting inventories are interrupted. Some solutions being considered include incremental dumping, improved audit trails (for manual recovery) and file integrity-checking software.

The production work order subsystem has one overall problem — that of required resources. The design of the software is such that many functions use Prime Computer, Inc.'s batch processing feature. This, in essence, runs one or more background streams, with jobs initiated by on-line programs via menu selections. All reports produced by the system are generated in this way. Thus far, the company has not devised an effective way of scheduling the batch jobs.

The system is effectively limited to a single batch stream, and the batch processor has no mechanism for automatically deferring certain jobs until off-peak hours (the system runs 24 hours a day, 7 days a week, but there is no formal split-shift use of the terminals). Jobs can be held and released manually, but this would require a full-time operator — a position Chris-Craft does not wish to provide. A resource quota system also exists, but the result of exceeding one's quota is cancellation of the job — an unacceptable course of action.

software that links



Only innovation can dam the backlog flood

By Lance Gil
Special to CWS

In data processing departments throughout the U.S., and most likely throughout the world, development groups are fighting a deluge of application backlogs. Despite the work of vendors and users to develop effective

solutions, their efforts can be likened to patching the leaks in an old dam.

New, innovative technology is needed to solve the problem of application backlogs. Many of today's most effective technological advances are the result of pure research effort, using the

best available technology and not relying on preconceived methods of solving problems. Software developers need to be given the time and resources to step back from the problem, to look at the "whys" and "hows" and to research available technology, see what works,

what does not work and apply the results of their findings.

Eighty percent of systems are functionally consistent, or generic, leaving only 20% that are not consistent — a concept that has not been explored in systems development.

More and better tools are needed to stay abreast of advancing technology as well as growing development needs. Advancements in hardware and software have opened a multitude of possibilities for better, faster, more sophisticated productivity tools.

Technology available

The technology is available to blend hardware and software to produce faster, more responsive machines for the end user. With software embedded in hardware on a chip, system functions are performed faster with less overhead required, thereby increasing productivity.

These concepts can be applied to many aspects of system development. Low-level normalizer modules can tell the system how to perform specific, generic functions. Cobol can then be written above the normalizer modules to tell the system what to do. If the normalizer modules could be coded directly into the hardware — on a chip — that would mean less overhead required each time a function is performed and response time could be improved by 50% to 60%.

With less reliance on bits and bytes, application development has been opened up to include proficient end users who know the "whats" of system development but not the "hows."

Unlimited possibilities

Already, we are seeing a blend of hardware and software on the IBM Personal Computer, from Basic on a chip to the many applications that include software and an expansion board. If this capability is made available to mainframes, the possibilities for faster, more effective development methods are unlimited.

Professionals in the fields of science and engineering have long recognized the value of stepping back from today's problems and looking to the future for solutions.

The application backlog is not going to be beat with more of the same technology. The rapidly maturing software industry is reaching the point at which it must support this type of research in order to overcome the demands that arise from the introduction of new technology.

We must be open to radical new methods and use the resulting information to our benefit.



CAN YOU FIND THE SEVEN IBMs IN THIS PICTURE?

We'll tell you where to look. Inside the CIE-7800 and CIE-7850.

The 7800 terminal is plug compatible with the IBM 3178 and all five models of the 3278 series. That accounts for six IBMs.

Now, when you add in the CIE-7850, you also get 100% IBM PC compatibility. That makes seven.

Even more remarkable, the CIE-7800 costs less than any single one of those IBM terminals.

It's more compact, too. Over 40% smaller. But the screen is larger. By 36%. The monitor tilts, rotates and weighs less than 20 pounds. Move it where you need it.

The detached keyboard has an 87-key IBM compatible layout. It can be user configured into any of 22 different U.S. and international keyboards.

The CIE-7800 is also available with concurrent alternate personalities that include DEC VT100, IBM 3275/3278-2 (bi-synch single station) and HP 2622, while still retaining IBM 3178/3278 compatibility.

And with the CIE-7850 plugged into the coax-A line, you have access to both on-line mainframe processing power and local IBM PC intelligence.

To learn more (and there are more advantages we haven't even touched on), just write or call our Distributed Systems Division Sales Representative: Alternate Channel Marketing, Inc., Suite 540, 3857 Birch Street, Newport Beach, CA 92660. Call toll-free 1-800-854-5959. In California, call 1-800-432-3687.

CIE SYSTEMS
A CHIEF TECHNOLOGIES COMPANY

Alternate Channel Marketing, Inc. Exclusive Sales Representative
© DEC VT100 is a Registered Trademark of Digital Equipment Corp. © IBM CIE Systems, Inc.

Old is director of Millennium support and development for McCormack & Dodge Corp. in Natick, Mass.

Introducing APS/IMS

40% Improvement in Productivity Without the "Black Box."

If you're an IMS user and looking at productivity improving tools, be careful. Most products on the market today have taken a "black box" generator approach to productivity improvement. While these tools can be fine for putting up simple things fast in a low-volume environment, they fall apart when subjected to the complex application, performance and maintenance issues of the IMS world.

Introducing APS/IMS —

The Source-Based, Layered Solution

APS/IMS is the application productivity system that, for the first time, offers a source-based, layered solution for the IMS Development Center. Source-based means that APS is engineered to be compatible with your existing source-level interfaces and requires no run-time overhead. With APS, you don't have to adopt a new language or a new design methodology.

The five APS components are housed in a layered architecture that uniquely addresses the different technical skill levels within your organization as well as the broad range of application development and maintenance requirements you face:

- **Screen Painter** — Facilitates interactive screen definition at 327X terminals or PC workstations. APS generates MPS, BMS, working storage and hard copy documentation.
- **Command Level Support System** — Features powerful DB and DC Command Sets in a Structured COBOL programming environment that allow programmers with no IMS experience to write comprehensive batch and online IMS applications.
- **Macro Level Interface** — Provides a macro language that enables senior technicians to control systems performance and integrity without needing "user exits" to the native IMS level.
- **Data Description Interface** — Reads your existing DBD and PSB source code. Automatically provides APS/IMS with information about the data structures.
- **APS Precompiler** — Generates native COBOL, IMS source code. Traps coding errors, validates IMS calls and adds no run-time overhead.

Increases Productivity By 40%

APS/IMS can begin immediately to address your IMS Development Center requirements without forcing you to sacrifice the control and flexibility you need. With APS/IMS, there is no "black box" and there are no traps.

To date, APS users are reporting design, coding and test savings of 25% to 40% over traditional methods — with savings of 50% during the maintenance phase.

Attend a Free APS/IMS Seminar

To learn more about APS/IMS, attend a free APS/IMS seminar. Just mail in the coupon or call 800-638-8703 and ask for the APS Registration Desk. And, if timing is critical, be sure to ask about the FAST TRACK evaluation process.

APS/IMS Seminar Schedule

| | |
|-------------|-------------------|
| June 5 | Philadelphia, PA |
| 12 | New York, NY |
| 14 | Chicago, IL |
| 21 | Los Angeles, CA |
| 26 | Toronto, CAN |
| July 10 | Dallas, TX |
| 12 | Houston, TX |
| 17 | Boston, MA |
| 19 | Washington, DC |
| 24 | Atlanta, GA |
| September 4 | Los Angeles, CA |
| 6 | San Francisco, CA |
| 12 | New York, NY |
| 18 | Washington, DC |
| 26 | Philadelphia, PA |
| October 2 | Atlanta, GA |
| 9 | Dallas, TX |
| 11 | Houston, TX |
| 16 | Detroit, MI |
| 25 | Boston, MA |
| November 7 | Chicago, IL |
| 13 | Los Angeles, CA |
| 15 | San Francisco, CA |
| 20 | Toronto, CAN |

VIS, I am interested in APS/IMS.

☐ I plan to attend the seminar on _____ (date).

☐ I can't attend now. Please send me more information.

☐ Timing is important. Tell me about the FAST TRACK evaluation.

Name _____

Title _____

Organization _____

Address _____

City _____ State _____

Phone _____ Zip _____

MAB, TO: Marketing Services, SAGE Systems, Inc.
3200 Monroe Street
Rockville, MD 20852

SAGE SYSTEMS INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686

Call 800-638-8703 Today

APS is available for users of IMS DB/DC, CICS, DL/I, CICS/IMS, and CICS/VSAM.
APS operates under TSO, CMS and CICS or on the IBM PC in a programmer workstation mode.

SPECIAL REPORT

Software technology lagging behind hardware

Consolidation, evolution, revolution needed to bring it up to par

By John R. Blumson
Seattle to CWS

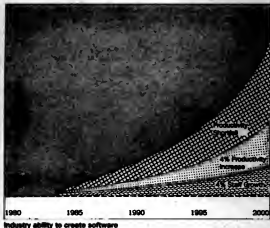
For better or worse, the Western world has chosen to rely increasingly on computers. And the computer industry has responded by developing a virtual continuum of more powerful machines. It has been a remarkable progression matched only by an accompanying steep decline of costs.

At the same time, we are implementing increasingly complex functions in software to execute on these computers, but the technology of software has not advanced nearly as far as that of hardware. And because software is still an emerging technology, the costs, the performance levels and the management problems involved in implementing a function in software continue to be high.

How do we go about increasing software productivity enough to make a difference? There are three strategies for improving both software productivity and quality beyond this range. Each strategy will have an effect in a different time period.

■ **Consolidation.** Apply existing tools to software development projects. Many tools have been developed which, although not integrated, can provide immediate improvements. Consolidation will have an effect today. Consolidation should readily and immediately yield improvements of 20% in productivity and up to 50% in quality.

■ **Evolution.** Provide integrated tool sets to aid and support the software engineer so that he will be able to produce an improved product more



efficiently than he can today. The evolutionary strategy will affect system development and support several years from now, and should yield improvements of 50% to 300% in productivity and up to 100% in quality over that typically found today.

■ **Revolution.** Fundamentally change the software engineering task. Develop methods and tools so that the engineer does not have to write each line of code anew for each application. In one way or another, software itself must be used to write the bulk of the applications, and the users, rather than the programmers, must determine the design of software systems. The revolutionary strategy requires more elapsed time to take effect, but it could yield improvements of up to 1,000% in productivity and two to four times in quality.

The objective of consolidation is to apply more widely the software support facilities that already exist; for example:

■ **Better quality hardware.** Increase video-screen size, resolution and display/refresh speed. More computing cycles allotted to each programmer to speed up the way in which a programmer can pursue and interact with existing code, press and data.

■ **Improved software tools.** Including high-level language compilers; microcode compilers; screen editors; on-line, source-level language debuggers; configuration management systems; and word processing.

■ **Better expression media.** Increase the functionality that the programmer can express in one statement through use of higher level coding languages and program design languages.

■ **Better methods.** Train the current staff to use modern methods and provide support for those methods to the practicing programmer. Tools exist today to support many of these existing methods.

The evolutionary strategy requires combining and integrating tools into a coherent engineering support environment. Integration is the key to the evolutionary strategy; this is in contrast to the use of isolated existing tools during consolidation. Productivity and quality can both be improved if the output of one tool is suitable input for another tool.

Evolutionary development techniques that could be applied within an integrated environment include:

■ **Reusing software when possible.** As in other trades, individual programmers have a style of working that causes them to do similar things in the same way as in the past. This provides the opportunity for a programmer to maintain libraries of small reusable units of software. If these libraries can be shared across a project or several projects, both productivity and quality are enhanced.

■ **Rapid prototyping.** Rapid prototyping is a technique for evaluating concepts prior to full system implementation. It can also be used for quick implementation of selected elements of a system for development, reducing risk. On the surface, prototyping appears to be a redundant effort, but it yields substantial productivity gains from a clearer understanding of the vital requirements involved.

With rapid prototyping, full system development can proceed more rapidly with fewer people, thus achieving a net cost reduction. Prototyping also allows senior personnel to contribute directly to critical software design problems.

■ **Automating the production of program documentation.** Much of the software engineering task involves documenting the design, the program interface or the program internals. We know today how to produce documents for a variety of restricted situations automatically. We can automate the production of pictures that capture the structure of complex data representation or capture the flow of execution of the program. Also, report-generators can create a new report by describing a mapping of data base elements and the desired form in which they are to appear in the report.

The consolidation and evolutionary strategies are based on the assumption that software will be built as is today; more dramatic gains—1,000% productivity improvement and up to 400% quality improvement—require revolutionary changes. Simply stated, the objective is to let users, not programmers, design and build software. Software engineering specifications authored by knowledgeable, experienced applications people can be the basis for automatic

See STRATEGY 5A/26



How to improve productivity in EDP system development

System Development

The Newsletter for Improving Productivity in EDP System Development



\$75.00/Year

Each issue of System Development contains the latest ideas and developments to help you ensure the timely completion of system projects, reduce growing development backlogs, and control development costs at all levels. We continuously survey the field and highlight the most practical ideas for productivity improvement from user experiences, conferences, the literature, and products. You get a concise, monthly review of the best ideas and methodologies in use.

- Save time each month in reading and research—we bring it all together
- Just one important idea could save you thousands in development costs

- ☐ Please enter my trial subscription to System Development and send me the first month's issue FREE. If I wish to keep System Development continuing for the next year I will honor your \$75 invoice.
- ☐ Send me more information about your monthly newsletter, System Development. 5/84

Name/Title _____
Company _____
Address _____
City/State/Zip _____
Applied Computer Research, Inc. • P.O. Box 5280 • Phoenix, AZ 85068-9280

ACR

Call Collect
(602) 995-5929

System manages DOE radiation data

LAS VEGAS — A new computer and a state-of-the-art relational data base machine, along with sophisticated software interfacing and a powerful applications generator, have given a U.S. government contractor the means to increase its efficiency in administering the Dosimetry Research Project for the U.S. Department of Energy (DOE).

The Dosimetry Research Project was begun to provide a fast and accurate response to requests from various agencies for information related to possible radiation exposure of individuals, according to Robert P. Thompson, systems and programming branch chief for Bevelco Electrical and Engineering Co. (Bevelco). Bevelco is the contractor that is also responsible for operations and maintenance at the U.S. government Nevada test site 65 miles north of Las Vegas. The dosimetry project gets its name from special half-dollar-size radiation recording devices, called dosimeters, worn by military and nonmilitary personnel where even the slightest possibility of radiation exposure exists. Periodic readings of these dosimeters are taken, the frequency of the readings depending upon the likelihood of exposure.

Because the records of these readings go back as far as the first atomic bomb tests in the Nevada desert, an enormous data base has been created in the dosimetry master file, with presently 1.4 million records of 1,000 characters each. According to Thompson, there has recently been a surge in requests for these records by individuals and organizations in response to claims, litigations and congressional inquiries.

Another problem

The task of meeting this influx of requests devolved upon Bevelco and Thompson. But Thompson was faced with another problem — an overloaded Control Data Corp. Model 6400 computer located in a facility here provided by the DOE. Response time on the CDC system was "quite slow," he said. Moreover, Bevelco did not have exclusive use of the system. "Other contractors were using the system, our business systems were on it, and the mass storage and CPU were approaching saturation," he said.

Because of the critical nature of the dosimetry data base, one which, Thompson said, "requires high integrity, quality and accuracy," his company began looking for another system that would be installed in Bevelco's own building. Two fundamental criteria were considered in the selection: a speedy, unimpeded access to data and a system that would make the shifting of the one-million-plus records of the dosimeter master file from the old system as painless as possible. Bevelco chose a Digital Equipment Corp. VAX-11/760, with 4M bytes of memory and 48 ports, as the host computer.

Bevelco also opted for a relational data base system. Thompson explained, "Other systems with hierarchical or network organizations were impractical. With the network approach, for example, once you have a data base, you have to relink and change pointers. It's a big problem to change things." He went on to say

that many of the dosimeter records were very old, and the file had changed over the years. Thompson needed the capability to get these files into a common format, to move different files into a single master.

Unfortunately, Thompson said, the trade-off for such flexibility was that the relational software was going to use a tremendous amount of the VAX-11/760's capacity. To solve this problem, Bevelco purchased a back-end data base machine called an Intelligent Database Machine (IDM), manufactured by Britton-Lee, Inc. of Los Gatos, Calif. To complement this hardware, Bevelco chose a VAX-to-IDM

user interface software package, Omnibase, sold by Signal Technology, Inc., of Goleta, Calif.

Thompson and his team began the conversion by creating tapes of 100,000 records, a restriction imposed by their having only one host disk drive. Those records were then broken down into 25,000-record blocks and applied one at a time, with checks made every 5,000 records.

The process involved copying from tape to disk, then performing a file migration from the front-end VAX to the IDM disk drives under Omnibase control.

The new system now supports 26

users, with 16 to be added shortly, and the "difference in the retrieval process is like night and day," Thompson said. Thompson credited a component of the Omnibase product, an application generator called *Smartstart* that also runs independently on VAX computers, for much of that speed.

Moving the 1.4 million records took two weeks, and not a single record was lost. With 2 million more records to be added to the dosimeter master file from other sources and another 125,000 additional records per year anticipated, the work is not finished.



CONDOR on-line programming that reaches new heights in productivity

To get the most from your IBM mainframe, you need CONDOR — a reliable, easy-to-use, high-performance system that runs above the rest through improved programmer productivity and low resource consumption. CONDOR's highly efficient processing methods and I/O facility improve system response time and can substantially expand the capacity of your CPU while maintaining personal requirements.

You can write and edit programs with CONDOR and submit them for compile or execution. You can view and modify data from input and output queues, release or cancel jobs, and spool output to local and remote printers.

CONDOR's built-in library management system automatically organizes as you process for optimum conservation of disk space. In addition to offering stringent security against unauthorized access and supporting multiple versions, it provides detailed audit reports and program cross-referencing — both batch and on-line.

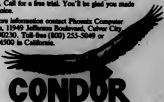
Boosting productivity even more, CONDOR's own high-level interactive programming language lets you create programs and JCL in a fraction of the time required with other languages. And a powerful set of interactive utilities makes system maintenance a breeze.

CONDOR operates standalone or as a task under CICS and the other major TP monitors to give you total flexibility, and it supports DOOR/VS/IE and MVS operating systems for versatility and upgrading capabilities.

No wonder respondents to a recent Dunham survey rated CONDOR tops in reliability, efficiency, ease of use, ease of installation, support, and realized financial savings.

So for a system that out-performs the others and gives you complete control of all your data processing, choose CONDOR. Call for a free trial. You'll be glad you made the right choice.

For more information contact Phoenix Computer Corporation, 11949 Jefferson Boulevard, Culver City, California 90230. Toll free (800) 253-5049 or (213) 827-4500 in California.



SPECIAL REPORT

STRATEGY

From 59/24

generation of large portions of software. Techniques that permit this are beginning to be invented and tested in computer science research laboratories.

Very high-level languages, algorithmic languages, or higher order languages such as Jovial, have shown that productivity and quality gains over assembly language can be achieved when programmers can express their intent in terms of a problem statement, rather than a machine-like statement. Typically, one higher order language statement generates three to five machine instructions.

The next step is to develop application-specific languages that are at a sufficiently high level so that pro-

The consolidation and evolutionary strategies are based on the assumption that software will be built as it is today; more dramatic gains — 1,000% productivity improvement and up to 400% quality improvement — require revolutionary changes. Simply stated, the objective is to let users, not programmers, design and build software.

grammers are effectively removed from the coding process. The languages would be sufficiently comprehensible in order that the user could declare his requirements directly in the language. The Atlas language is an early example of such a language. It is not written for programmers; it is written for electrical engineers who need to test hardware. With

such user-oriented languages, field changes would be easily implemented by the operations staff.

Application generators. Today, there are commercially available systems that allow an individual to generate programs via either a question-and-answer or fill-in-the-blank interaction with computers. An application generator (written by pro-

grammers) then automatically develops software to perform a specific function based on user answers. Consider today's spreadsheet programs. The user defines the problem as a relationship between elements of the data base and a program constructs that computing values for each desirable component. It is the user who directly defines the problem to the computer; no programmer is involved.

Reusable software applications. Commercial off-the-shelf software packages, such as operating systems and compilers, have long been reused. Conversely, effective applications software is almost invariably built anew for each system. In applications software would yield dramatic productivity gains; using existing software in lieu of new software saves program development costs, documentation costs and test costs. If the software has already been verified or used extensively in the field, its quality will be vastly greater than that of new software.

Knowledge-based expert systems. An expert system is one that has relatively complete knowledge of some subject. It understands the basic concepts relevant to that subject and can perform typically relevant analyses and syntheses. Expert systems can reason about the subject area, determine what to do next to reach some goal and explain to the user the sequence of reasoning used. Expert systems have been created in the areas of mass spectroscopy interpretation (Dendral), medical diagnosis (Mycin), geological exploration (Prospector), and computer hardware configuration determination (E-1), which is the first expert system that has been used by choice in a commercial situation.

Expert systems must be programmed in the conventional way to contain rules for reasoning about the subject area. However, once written, the expert system can be used by a person who is not an expert in software, but an expert in the particular subject area. It can then be used in many situations where, today, new programs would have to be written.

An expert system could be developed to construct a particular kind of software. In that case, it could write new software of the sort that it understands, with directions from its user.

All three strategies contribute to the increased productivity needed to combat the growing problem. All three strategies are needed and should be implemented immediately. The revolutionary strategy will achieve the highest payoff, but will not begin producing results for another five years. In the interim, we need the productivity improvements possible with the consolidation and evolutionary strategies to keep pace with the near-term requirements that will otherwise prove insupportable.

Both the consolidation and evolutionary strategies are based on techniques that the private sector can implement itself. This implementation requires some investment, of course, but it is an investment that can generate a return far greater than any other investment.

The revolutionary strategy requires investments that are of a much higher magnitude and that will require a much longer period to pay dividends. As a result, they are beyond the reach of all but the very largest firms and the government.

CHALLENGE US

TO CLOSE THE GAP BETWEEN HOW YOUR CICS/MVS SYSTEM DOES OPERATE AND HOW IT SHOULD OPERATE.

- Improve your system uptime...
- Keep your test and production systems running...
- Make your job scheduling easier...

DADS, the Dynamic Allocation/Deallocation Subsystem from STAR, is the unbreakable software support system for more efficient CICS/MVS operations.

DADS, worth its price.

GET MORE DETAILS TODAY about the DADS challenge from Software Technologies and Research, Inc. Call us collect at 203-529-7128. Or mail the obligation-free coupon below.

Yes, I'm interested in the DADS challenge. Send detailed information with technical data.

Name _____ Phone _____
 Title _____
 Company _____
 Address _____
 City _____ State _____ Zip _____

Software Technologies and Research, Inc.
 41 New Britain Ave., Rocky Hill, CT 06067

DADS from STAR
— simply brilliant.

STAR

Software Technologies and Research, Inc.
 41 New Britain Avenue
 Rocky Hill, Connecticut 06067
 203-529-7128

Micros help shift productivity emphasis

By Robert Schuchman
Special to CWS

Although discussion of productivity often concentrates on issues of programmer productivity and more effective programming tools, the bottom line for corporate management productivity is whether accurate information is available in time to take corrective action.

In other words, information systems programmer productivity can be measured in terms of its ability to support an increase in management productivity.

This is not to say that fourth-generation languages, programming aids and code generators are not important.

They can be crucial to program generation and development. However, these tools are only meaningful in a context in which the information system has the ability to deliver data from the data base, application programs or outside data sources to the manager's desktop.

Confusing help

The means for delivery of management information is available in the form of the personal computer. However, the vast proliferation of personal computers has probably been more confusing than helpful to most corporate DP departments.

Personal computers and personal computer software have the potential to increase significantly the productivity of corporate managers. One of the two major uses of personal computers is as a management workstation (the other being as an end-user precursor).

Yet the mere presence of the personal computer on a manager's desk does not ensure that the manager's productivity will increase.

If the personal computer cannot be intelligently linked to the mainframe so that all of the relevant data on the mainframe is available to the personal computer user for analysis and action, then the personal computer is not a useful tool to the manager.

Analysis standpoint

What does a manager want to know from an analysis standpoint? To make decisions, not policy and oversee changes, most managers are not interested in details, but in summarized data or information.

Data involves a lot of detail over a short amount of time, whereas information represents a smaller amount of detail available for a longer period of time.

Converting data stored on a mainframe computer to information is necessary to make that data useful to today's managers — personal computer users.

If managers using their personal computers are required to do that conversion themselves, using a query language or report writer whenever they want access to the company data base, they will have to know a lot about the mainframe, query languages and many other aspects of DP

software. Productivity goes down, as does the efficiency of the microcomputer.

Ideally, managers want data from the mainframe to appear as information on the personal computer so that they do not have to learn about mainframe operations to use their microcomputers. The easiest way to accomplish this is to make the mainframe appear as if it were another disk available on the personal computer.

If all the data resident in the mainframe appeared as an additional disk to the microcomputer user, then the mainframe would become an extension of the personal computer. There are no languages to learn, and files are downloaded through predefined, automatic procedures. Managers would simply be using files from the mainframe in the same way they would use their personal computer files.

Productivity is also increased when information can be prepared or observed on a personal computer, then uploaded, or included with the mainframe data.

This compares to saving a file, the same way a user would save it on a hard or floppy disk. Once this capability has been es-

tablished, managers using their personal computers have unlimited disk storage capacity. They can use the storage available on the mainframe and are no longer limited to floppy and/or hard disks.

An intelligent link between the mainframe and micros also enables all the personal computers connected to that mainframe to communicate with one another.

A complete software solution embodies the true information center — the key to future productivity for managers and those interested in maximizing the utility of microcomputers in a business environment.



Environments which are user friendly produce friendly users. Make a friend!

How to stop the grumbling

MANAGER SOFTWARE PRODUCTS' CONTROLMANAGER™ risks your users of the severe coding task of having to learn how to interact with yet another software product. It enables them to match the functionality of a software product with their specific requirements, while at the same time removing the need for them to become "system" knowledgeable.

Meet the CONTROLMANAGER family

CONTROLMANAGER is truly integrated and being a member of **MSP's MANAGER Family**, is totally dictionary driven. **CONTROLMANAGER** is initially available exclusively for the other members of the **MANAGER Family**. These include **DATAMANAGER®** the data and information resource management system, **DESIGNMANAGER™** the logical data base design and information modeling system and **SOURCEMANAGER™** the Cobol application development system.

msp

MANAGER SOFTWARE PRODUCTS INC

Office worldwide: Australia, Brazil, Canada, Italy, Japan, Scandinavia, Spain, Switzerland, Austria, U.K./France, U.S.A.: West Germany.

Interface with ease

CONTROLMANAGER is the interactive interface between the person, the machine and the software. It provides automatic navigation for the user to get where he wants to be. It is simple and logically tabular.

Let's get together

Find out how **CONTROLMANAGER** can help you make friends with your users. Send the coupon today or call (617) 863 5800 (Telex 710 326 6431).

Send me more information about **MANAGER SOFTWARE PRODUCTS' Family** of integrated, dictionary-driven products:

☐ **CONTROLMANAGER** ☐ **DESIGNMANAGER**
☐ **DATAMANAGER** ☐ **SOURCEMANAGER**

Name _____ Title _____

Company _____

Address _____

City/State/ZIP Code _____

Telephone Number (_____) _____

Send coupon to **MANAGER SOFTWARE PRODUCTS INC.**

131 Harvard Ave., Lexington, MA 02175-5126.

Or call (617) 863 5800. Telex 710 326 6431. **CONTROLMANAGER**

DATAMANAGER is a Registered Trademark of MSP Limited

Goldman is president and chief operating officer of Oculent Software, Inc., a Watwood, Mass.-based developer of programs for IBM mainframes and personal computers.

Software tool drives Jaguar's MIS effort

LEONIA, N.J. — Jaguar automobiles have long enjoyed a worldwide reputation for high performance, sleek efficiency and a sticker price to match.

In the U.S., in the midst of the recession, sales of the six- and 12-cylinder cars increased from 3,000 units in 1980 to almost 16,000 in 1983. The MIS department of the U.S. division of Jaguar watched this growth with obvious satisfaction, even as the department's backlog of applications grew to three or more years.

MIS manager Bill Morris knew he had to match increases in productivity achieved on the assembly line in

the UK with productivity boosts in his 13-member MIS department here. Through automation, Jaguar had increased productivity from 1.50 cars per employee in 1980 to 3.6 cars per employee in 1983. Taking his cue from the manufacturing area, Morris, in late 1983, began to look for ways to automate the MIS function and thereby squeeze more performance out of the available resources.

"Because of the tools we had to work with, system development was a problem," Morris recalled. All on-line work was done in assembler under CICS, he explained, and, adding

insult to injury, only the department managers did the actual coding. The programmers were not doing on-line development at all because of the complexities of macro-level programming.

Morris decided that it made no sense to train existing staff on the existing CICS methods.

First, the learning curve for CICS was considerably long. Second, the approach would violate the principle that true productivity is a result of people working not harder, but smarter.

Moreover, the entire system is vulnerable when the programmer is do-

ing virtually everything. One bug can bring the entire system down. As a result, CICS programmers are in great demand throughout the industry. Hence these programmers expect — and receive — premium salaries.

The alternative that Jaguar considered was to automate the systems development process by leveraging the use of Cobol. "We decided to take the people we had and increase their productivity in what they knew well," Morris said.

Shedding a development tool

Expertise in Cobol was well-represented across his entire staff. The challenge was to locate an application development tool that would support the Cobol programming effort in a CICS/VSE environment.

In November, 1983, UFO/Cobol from Oxford Software, Inc. was installed on Jaguar's IBM 4341 under CICS Release 1.4.1. "With UFO/Cobol, you're really divorced from the intricacies — and dangers — of CICS," Morris said.

Another advantage the staff perceived was in the area of screen painting. The UFO/Cobol facility remembered all alterations, field names and attributes. Because modifications could be made more easily, the facility made it possible for users to participate in the system design process. Morris said that the results were better systems and more satisfied users.

But the telling point for Morris was that UFO/Cobol is completely a tool for Cobol programmers. "It is as close to batch Cobol programming as you can get," Morris said. The basis of the tool is a series of standard Anol Cobol statements with natural extensions to handle the complexities and requirements of an on-line environment.

Improved quality

In the first month after Jaguar began production work with the new tool, the number of on-line applications increased dramatically. Quality was also improved because it was practical for Jaguar departments to see reports and screens prior to final delivery of a system. In UFO/Cobol's Demo mode, analysts could simulate the final system by defining a group of panels in a sequence. By assigning a programmed function key to each panel, Demo mode allowed Jaguar users to walk through an application before writing any code.

"UFO/Cobol will help us take a bite out of the current backlog," Morris explained, "and it's going to open up a hidden backlog, as well. Because of our ability to be much more responsive, many more users will submit requests. We're going to be able to do more, but we're also going to have more demands of us."

"The answer," he suggested, "is to consider that traditional MIS approaches may not always be the best solution."

"The challenge is for everyone to recognize that the MIS department functions as a service company for the rest of the organization. It must develop the tools and procedures to increase efficiency and productivity if it is to remain competitive and viable."

WHY WASTE YOUR COBOL TESTING/DEBUGGING TIME?

XPEDITER™

OFFERS MORE TIMESAVING FEATURES THAN XPF/COBOL™ OR IBM INTERACTIVE DEBUG™

- **ELIMINATE TEMPORARY COMPILES** - Why recompile to test/debug your programs?
- **SAVE & REVISE YOUR TEST SCENARIO** - Why reinvent the wheel for repeated testing?
- **SELECT INTERACTIVE OR BATCH OPERATIONS** - Why sit at the terminal for every test session?
- **TEST OPTIONALLY AT THE MODULE LEVEL** - Why test the entire program hierarchy for a change in one module?
- **AUTOMATE TEST RESULT COMPARISON** - Why manually compare test results for every program modification?

COMPARE

Fully integrated into all MVS, VM/CMS and Data Base environments

XPEDITER is a trademark of ADS Inc.
IBM COBOL is a trademark of International Business Machines Corp.
IBM INTERACTIVE DEBUG is a trademark of International Business Machines Corp.



Application Development Systems Inc. •
7420 Unity Ave., MPLS, MN 55442
Tel 1-800-358-3048 / In MN (612) 560-8633

YES, I want to know more about XPEDITER

- ☐ Send Literature
☐ Send 30 day, No Risk Trial Agreement

NAME _____

COMPANY ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Dynamic mainframe looking for suitable personal mate.

If you speak or want to learn IFPS;
we could make beautiful decisions together.
P.S. Let's meet at the Information Center.

In the past, the hardest thing about financial planning was planning how to do it. That was until Execucom introduced IFPS. IFPS makes problem solving and decision making a lot easier. The tangle of technical details is avoided. And managers are able to master it in a very short time.

Now, financial planners have an opportunity to extend the power of IFPS Decision Support Software to their personal computers, an incredible advantage over any other Decision Support System available.

See Your Mainframe And Personal Computer Work Together At The Information Center.

When IFPS/Personal™ is linked to your mainframe through the Corporate Information Center, the reach of financial planning software is extended throughout your entire organization. You can easily and quickly transfer models and data between your mainframe and desktop computers and solve these models on either end.

You can share and consolidate individual models, reports and data files. You can create them all on your Personal Computer and process them on your mainframe. And IFPS is compatible with the leading general ledger, database and statistics software packages used by corporations.

Do All Your Planning And Modeling In English.

Thanks to the non-procedural language used in both IFPS and IFPS/Personal, you do not have to be a computer expert to build sophisticated models. Or to understand those that other people construct.

Receive The Most Comprehensive Computer Software Training And Service Program Available.

Not only a fact, but a promise. We have developed a support program that offers mainframe-level support on IFPS/Personal. It includes expert technical support for installation, superb documentation, comprehensive training programs, HotLine support, specialized consulting, periodic product enhancements and user associations. We believe that state-of-the-art technology deserves state-of-the-art service.

If the personals ad above looks like it may have been written by your lonely mainframe, call or write Execucom immediately and we'll tell you how you can get it an IFPS/Personal mate. If your mainframe doesn't have IFPS yet, call or write us today and we'll help you make your decision. Execucom Systems Corporation, 3410 Far West Boulevard, Austin, Texas 78731. Call 1-800-531-5038 or in Texas or Canada, call 512-346-4980.



EXECUCOM

IFPS, IFPS/Personal are registered trademarks of Execucom Systems Corporation.

General problem-solving methods will ease

By Laura L. Scherer
Special to CWS

In the ever-changing world of business applications, prototyping is an exciting concept for software development. It offers increased development productivity and enhanced system quality all rolled into one. But if you're in a shop that is just now settling into the rigors of the practice

Keep the concept of prototyping simple by thinking of it as ... anything that significantly reduces the wait time between when a user describes a specification and when he sees that specification.

system development and project management structures that became popular in the 1970s, then prototyping might be forcing you to re-evaluate your methods just at a time when you are ready for a breather.

Don't worry. Prototyping does not happen overnight. If you are a going concern, you have to deal with the

old as you take on the new, and that takes some time. You must likely have a huge investment in software and, of equal importance, in software development practices that must be considered, protected and managed for optimal payback even as you bring in new methods. This investment, and the value of your current

portfolio, must be balanced against the rationales and promises of prototyping. With this in mind, how do you keep the best of the old while incorporating the best of the new? How do you get there from here?

First, you must dispense with semantics. Don't argue about what prototyping is, because it is really many things. The best definition for prototyping came from James R. Johnson. He captured the many facets of prototyping by distinguishing four levels of prototyping activity:

■ Level 1 — Mock-ups of printed reports or screens.

■ Level 2 — Simulated interaction of on-line activity or batch reports.

■ Level 3 — A partial working model of a system that can be gradually expanded, completed and implemented.

■ Level 4 — A research project that uses a working model to prove the feasibility and approach of a system design. The result may or may not be pursued.

Keep the concept of prototyping simple by thinking of it as just about anything that significantly reduces the wait time between when a user describes a specification and when he sees that specification — preferably in action. It is from these two elements — time compression and the availability of a model — that the benefits of prototyping originate:

■ The more quickly you develop a system, the less time there is for the business environment to change around the project, so fewer specification changes are forthcoming.

■ There can be immediate detection of communication errors.

■ The user gets quick reinforcement of his ideas, as he is drawn into the project.

■ Prototyped designs are, to a large extent, self-documenting.

■ System development red tape is minimized.

■ There is the possibility of eventual implementation of the design model into production.

Crossing the semantic bridge is the first step toward prototyping from wherever you are now. Focus on reducing the wait time between system specification and system demonstration. With that focus, there is much that can be done today within your current environment.

The next step toward prototyping is to concentrate on solving a problem rather than trying to construct a methodology. System development, especially the design portion of system development, is a specialized application of the general principles of problem solving, which any elementary psychology book will tell you involves only a few steps:

■ Step 1 — Preparation. Determine what is the problem, find out what information is available, and identify constraints imposed on the solution.

■ Step 2 — Production. Create alternative solutions.

■ Step 3 — Judgment. Evaluate alternatives and select the best answer.

Traditional methodologies are nothing more than the essential elements of problem solving, with a lot of fluff added for exaggerated precision, pedantic and superfluous communications and effect. All of this ef-

Scherer is manager of information systems planning and management services at G. M. Scott and Sons, Inc., a Marysville, Ohio, lawn and garden products firm.

Psssst! Did You Know That...



On Thursday, February 23, 1984...
**IBM Announced VS COBOL II and
SRA Announced IBM VS COBOL II
Facilities?**

VS COBOL II

VS COBOL II is a new IBM licensed program that is intended to provide the base for future COBOL language enhancements. It includes many new features to increase productivity, such as re-entrant object code, structured programming language, and interactive debugging capabilities.

SRA's IBM VS COBOL II Facilities

Now, users and prospective users of this new program can easily learn about its potential, from management overview through in-depth understanding, with SRA's new IBM VS COBOL II Facilities. This new multi-media self-education course makes vital information accessible where and when you need it. Management can quickly assess the differences between OS/VS COBOL and VS COBOL II. And experienced COBOL programmers can cover technical topics, such as:

- Structured Programming Techniques
- The Sequence, Selection, Iteration, and Case Structures
- Debugging Enhancements
- Listing Enhancements
- Migration Considerations
- CCS Considerations

This new SRA course provides independent study through a two-volume text, video cassette, and a Personal Reference Guide, and requires only nine to eleven hours to complete. The course can be leased for either 30 days at \$315 or 12 months at only \$900.

Even if you are not installing VS COBOL II this year, you'll want to be among the first to know all about the new IBM COBOL compiler. For more information, call SRA at 1-312-961-7120/7110, or write in coupon.

To Order: Call IBM Direct at 1-800-IBM-2468.

SRA

Science Research Associates, Inc.
Information Systems-Education Division
155 North Wacker Drive
Chicago, Illinois 60606

A Subsidiary of IBM

Yes! I want to be among the first to know! Please send me more information about SRA's IBM VS COBOL II Facilities.

Name _____
Title _____
Company _____
Address _____
City, State, Zip _____
Phone _____
Mail To: _____
SRA
Information Systems-Education Division
Marketing Department—No. Five
155 N. Wacker Drive
Chicago, IL 60606

SPECIAL REPORT

your move to prototyping, if you use them

fect takes time, and taking time is precisely what we're trying to avoid with prototyping.

So the second step on the road to prototyping is to remember: Don't do anything unless it contributes directly to solving the problem at hand. Hang on to the best of your old methods — your carefully learned analytical thought process, your techniques for arranging and diagramming the flow of information in a system, your different frameworks for generating and testing alternate theories. But at the same time, pare down your methods. Dispense with the written word and with formality for formality's sake whenever you can do so without jeopardizing your real objective: solving a problem.

The third step toward prototyping is to recognize that you do not have to build the whole system all at once. Similarly, you do not have to design the whole system before you can begin to build one part of it. Instead, prototyping encourages a building-block approach to system development that looks like this:

• Devote some study and analysis time to get a high-level overall pic-

ture of the problem at hand.

• Decide what system pieces are needed and, in the broadest sense, how they must fit together. The glue is an overall data base concept.

• Pick out the hub or foundation of the system (often a critical data base with its updates and inquiries).

• Offer to design and implement that portion of the system first, promising early delivery and a quick return from that most essential part.

• Then build one piece at a time onto that foundation.

The third step toward prototyping is to time-slice your projects. Build a foundation first and hammer out

quickly any problems it might have. After the foundation is right, start adding to it one step at a time. This project engineering concept can begin to offer the benefits of time compression, even within your current environment of methodologies and tools.

The fourth step toward prototyping is to recognize it as a new and developing approach to system development and simply try it. Don't require proof of the concept before you are willing to get your feet wet. Don't wait for a how-to-do-it cookbook to come along before you begin. Become comfortable with the basic elements of the concept (simply, time

compression and modeling) and then see how you can make these concepts work for you.

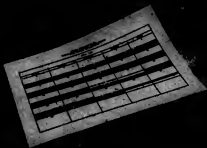
You cannot prototype and play by the old rules at the same time. If your managers, your users and your auditors are maneuvered out of methodology, big projects and volumes of design documentation, you will be hard pressed to convince them — on paper — that prototyping has anything to offer. So just do it.

Set up a pilot project, position the project as an experiment as you are allowed to break the rules, and then let the concept speak for itself in terms of its results.

PHILON
FAST
COMPILERS

Now for MC68000/UNIX

The SAS System...



| Variable | Value |
|----------|-------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |



| Variable | Value |
|----------|-------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |



| Variable | Value |
|----------|-------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |



| Variable | Value |
|----------|-------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |

The Solution to Your Information Center



- ☐ I want to learn more. Send me The SAS Solution packet.
☐ Have a sales representative call me today!

Please write your name and address below, or attach your business card.

Name

Title

Company

Address

City State ZIP

Hardware

Operating System

Telephone # ()

SAS

SPECIAL REPORT

Team approach mixes design, development,

Special to CWS

A lot has been written about the three D's of programming — Design, Development and Documentation. There is a method whereby all three are integrated into a single, simple process that can be easily implemented.

The approach is team design using the Warner methodology. Team design will help achieve high-quality programs that are structured, functionally correct and fully documented. In fact, the program will be documented before a line of code

code is written, at little or no extra cost.

Working in teams is a long-established practice that reduces the isolation of the individual programmer. It takes advantage of the combined skills and knowledge of a group to complete a task.

At the same time, it expands the individual's abilities through exposure to the ideas of others.

Team design is the development of a program design by a group instead of an individual. It is the investment of their collective knowledge at

the beginning of a program to achieve a correct design the first time, rather than investing resources to remedy problems later.

The product of team design is a detailed program design showing all modules, control logic, process steps within each module and the documentation. It does not include the actual code. Cod-

THIS IS ONE FORM OF REAL TIME SCHEDULING.

ADC2 SOFTWARE IS ANOTHER.

Automated Data Center, ADC2, is innovative and non-traditional software that manages critical components of IBM's MVS computer operating system. It takes unique advantage of the MVS subsystem architecture.

It's intelligent software that's a real-time scheduler and monitor of job and system performance.

A software system that's very simple to use. Run for the novice.

ADC2 dynamically gathers job performance statistics and maintains this information as current and historical data for quick, on-line access.

Of course, ADC2 is designed to smoothly build schedules and access all your data center management information, ensuring increased control and throughput under the most demanding circumstances.

Additionally, your scheduling can be conveniently decentralized: different departments and remote sites are able to develop their own job schedules with simple commands.

And we made ADC2 extremely easy to implement. While other job scheduling systems typically require months and months of pre-planning and data entry, ADC2 can be productive the very same day it's installed.

It's that good.

For a demonstration of ADC2 or further information on the Cambridge A**2 family of high-performance software systems, we invite you to call Mr. Sharon McLaren direct: 415/941-4558.

He'll be glad to tell you about a software system that performs with flying colors.

This article was prepared by Karl Smith, Stan Wall and Hudson Henry. Smith and Henry are vice-presidents and Wall is president of New Generation Software, Inc., a consulting firm based in Salem, Ore.

The Cambridge Systems Group



24275 Elise, Los Altos Hills, CA 94022, U.S.A.
(415) 941-4558 • Telex 357437
London Paris Munich

documentation in cooperative programming

ing and compiling are still accomplished by the individual programmer.

The design team is usually composed of at least three people, but never more than five. Ideally, a team should be made up of an analyst and two programmers. The person who will do the actual coding is always a part of the design team to ensure that he thoroughly understands the design and desired results. A fourth member may be included for training purposes.

Including the analyst in the entire design process significantly improves the flow of information, thereby reducing the overall development time. Another benefit is

that immediate feedback is provided to the analyst as to how well he has communicated via a specification.

A team-designed program starts in the traditional way. An analyst develops a program specification in a narrative form, and specifications are given to each person se-

lected to participate in the task.

After the individual members have examined the specifications, a formal review is held. If significant deficiencies are found, the analyst will rework the specifications, and a subsequent review will be held.

The team meets shortly after the review to develop the actual program design.

The design process begins with the development of a logical, high-level description of the program. Once this is completed, a detailed Warner diagram that represents the physical design is

developed. All necessary procedural steps are defined in this process. The level of detail may vary, but should include anything needed to document clearly what is to be accomplished.

The design details are prepared in structured English. See TEAM 55/40.

Maintain a strict set of rules

It is important that a design process be governed by a clear set of rules.

All members must be committed to the design effort. It is a team responsibility, not an individual responsibility.

Designers must participate. All members are equal. There is no rank or position in the team. Each person must sign off on the design.



Introducing HIBOL. It brings your CICS systems development up to speed.

Until now, data processing backlogs, unmet deadlines, cost overruns, and unhappy users were practically unavoidable. Because traditional methods of CICS/COBOL applications development moved at a snail's pace.

That's the reason Nixdorf Computer Software Company developed HIBOL. HIBOL is a solution-oriented, interactive application development system. And it generates complete CICS/COBOL applications in a fraction of the usual time.

With HIBOL, even non-CICS programmers need only a few hours of training. And then they can develop portable COBOL applications for both CICS and batch in hours, instead of weeks. Here's why:

By providing simple specifications to HIBOL, the system provides 100% of the code required for your application programs. Because HIBOL produces error-free, modular COBOL source code and BMS

maps for CICS, debugging time is reduced by up to 80%. And HIBOL generates application documentation automatically.

HIBOL runs under CICS/VS in DOS/VSE and OS operating systems on the IBM 370, 4300, 3000, and other compatible mainframes including the Nixdorf 6890. For more information, and a demonstration of HIBOL, call us toll-free at 1-800-446-9900. (In VA, 804-276-9200.)

Nixdorf Computer Software Company

**NIXDORF
COMPUTER**

6517 Everglades Drive, Richmond, VA 23225

Application generators focus on data base

By Steven Pfenstinger
Special to C&E

Your MIS manager made a good decision. He listened to all the well-known authors and lecturers advocating 10:1 productivity gains through the use of the new application generator.

He completed a product evaluation, made a selection and had you trained to use the new application generators. Now you're ready to address that application backlog, right? Not yet. You've been trained to program with this new high-level language, but do you really know how to design systems for application generators?

Designing systems for application generators is different from designing traditionally developed systems. Application generators are inherently data-base-oriented, not process-oriented, and are built to interface with a data base management system. This means that the new system will be built around the data base and not vice versa. This requires that the data base design issue be addressed sooner in the development life cycle.

The need for a stable, normalized data model, prepared during the early stages of the design effort, is now a minimum requirement. This, plus

Pfenstinger is a software consultant based in Elmhurst, Calif.

Designing systems for application generators is different from designing traditionally developed systems. Application generators are inherently data-base-oriented, not process-oriented, and are built to interface with a data base management system.

numerous other application generator considerations, needs to be addressed.

Approaching the design of the system with the application generator and its data base orientation in mind involves a recommended sequence of events:

- Define the functional requirements.
- Build a data model.
- Understand the application generator.

- Create the specifications.
- Conduct design walkthroughs.
- Consider prototyping.
- Design the physical data base.

This is the traditional functional decomposition of the user's requirements, one where the system is broken down in a top-down fashion until the lowest subfunctions can be identified with some transaction (unit-of-work) process that can then be related to some number of programs and screens (henceforth referred to as transactions).

- Building a data model. Numerous books and vendor products address this effort. Very simply stated, this is the grouping of related fields into segments and the segments into logical views that depict the segment relationships within subject data bases.

- Understanding the application generator. Every application generator has a number of options, considerations and restrictions that must be understood if it is to yield the productivity gains stated by the vendor.

- The specifications. If the application generator is data-base-oriented, it seems natural that the programming specifications should use a data-base-oriented technique, one that insists that the preparer identify all the required segments and keys in the data model required for a particular transaction process.

This screen map, as it is sometimes called, shows the interaction with the data model and will be the basis for the action diagram (specifica-

tion). The action diagram is simply the screen map expanded to include the transaction logic (field editing, processing, document generation and so on). Accompanied by appropriate attachments (screen layouts), the next step is a walkthrough.

- Design walkthrough. The design walkthrough usually involves the preparer, a knowledgeable user and an experienced application generator developer. Together they will determine, through an iterative process, whether the transaction will meet the user's needs and whether it can be programmed with the application generator. Do not make the fatal mistake of thinking walkthroughs unnecessary.

- Prototyping. Because application generators are great for creating skeletal versions of the transaction process, a prototyping step may be useful or required to confirm user satisfaction.

- The physical data base. Define the physical characteristics of the data base, load it with some test data and get started.

Follow these steps when appropriate, and you can nearly guarantee success; not following these steps can almost always guarantee dissatisfied users, unnecessary delays, substantial technical problems and a group of developers and designers ready to blame the application generator for their failures.

Thoughtware.

Management Diagnostic Series
(\$330 each)

- 1.1 Assessing Personal Management Skills
- 1.2 Evaluating Organizational Effectiveness
- 1.3 Understanding Personal Interaction Styles

Management Training Series
(\$450 each)

- 2.1 Leading Effectively
- 2.2 Motivating To Achieve Results
- 2.3 Defining Goals And Objectives
- 2.4 Improving Employee Performance
- 2.5 Performance Appraisal
- 2.6 Managing Time Effectively
- 2.7 Conducting Successful Meetings

Become a better manager by visiting your local computer dealer or call us at our toll-free number, 1-800-THT-WARE, or write: Thoughtware Inc., Dept. S, 2699 So. Bayshore Dr., Coconut Grove, Florida 33133.

Thoughtware Programs run on the following IBM PC and compatibles with color graphics card, Apple II Plus and IIc.



Expanding The Universe Of Learning.

INTRODUCING YOUR NEW NIGHT SHIFT.



INTERVIEW: "BICOMM-3700" is designed for use with IBM PC compatible systems. Available now at \$199.95 per unit, including a 3.5" disk.

BICOMM-3700 lets you personal computerize with a mainframe even when you're asleep. Telephone calls no longer. Minutes don't count. And how many times are you awake at 3:00 AM?

HOW IT WORKS

The BICOMM-3700 communication package emulates the popular 2700-3700 series of RJE stations, with many added features. You can program a simple command file to direct it's operation when you are asleep. Of course, you can also handle files in an interactive, menu-driven mode day or night.

WHY BICOMM?

You'll be able to sleep soundly because BICOMM-3700 uses the BICOMM common communications protocol—tested and proven effective for over fifteen years. It contains powerful error detection features to insure that your data arrives safely and soundly, without a complete time-consuming audit of everything it does.

WHY NOT BICOMM?

You may think that works fine, but often because it can communicate at speeds up to 19,200 baud, and up to 5000 baud over dial-up, many grade telephone lines using standard modems. Your system no more needs an expensive special modem than you need to arrive at the end morning you'll already have a big head start on the day's activities.

BICOMM-3700

Per your night shift to work for you tonight!

Professional Solutions
CORPORATION

Order inquiries invited.
Professional Solutions, Inc., One Management Quadrangle,
Rte. 2, N. W. Atlanta, Ga. 30317, USA
(404) 752-1000, Telex: 154343

The BICOMM 3700 was developed by William Spence, Inc.

"IDMS/R is the perfect DBMS for the IBM 4300 user."

Frank Chisholm*

Because IDMS/R, with its Automatic System Facility, makes your IBM 4300 as easy to use as a personal computer.

The Automatic System Facility (ASF) is so comprehensive and easy to use that all an IBM 4300 user need do to develop an application is to define a relational record. ASF then dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. In other words, the developer can witness the application being produced, literally, in seconds. This is what makes ASF a major advance over fourth generation languages. Thus IDMS/R is the perfect system for the IBM 4300 user with limited staff resources.

But suppose when you build a complex, high volume production application with IDMS/R, you desire outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance.

We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, a full integration with personal computers and a complete line of integrated financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of the IBM 4300 user who wants to develop both production and end user applications faster and easier.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call Cullinet at 1-800-225-9830 (in Massachusetts 617-329-7700).

*Frank L. Chisholm is Cullinet's Executive Vice President. Frank has worked closely with Cullinet users and prospective users for more than six years. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's database product development strategy.

IDMS/R Seminar Cities and Dates

| City & State | Date | City & State | Date | City & State | Date | City & State | Date |
|----------------|---------|--------------------|---------|-----------------|---------|-----------------|---------|
| Albany, NY | June 12 | Pl. Worth, TX | June 12 | New York, NY | June 20 | Boston, MA | June 10 |
| Atlanta, GA | June 10 | Grand Junction, CO | June 10 | New York, NY | July 24 | Boston, MA | June 21 |
| Birmingham, AL | June 26 | Indianapolis, IN | July 10 | New York, NY | June 14 | St. Louis, MO | June 10 |
| Chandler, IL | June 28 | St. Louis, MO | June 28 | Long Island, NY | June 12 | St. Louis, MO | June 27 |
| Chicago, IL | June 12 | Knoxville, TN | June 23 | New York, NY | June 12 | South Bend, IN | June 21 |
| Cincinnati, OH | July 18 | Lexington, KY | June 27 | Portland, ME | June 14 | Tallahassee, FL | June 26 |
| Cleveland, OH | July 11 | Los Angeles, CA | June 26 | Portland, ME | June 12 | Tampa, FL | June 21 |
| Columbus, OH | June 27 | Montclair, NJ | June 10 | Orlando, CA | June 26 | Tampa, FL | June 21 |
| Denver, CO | June 15 | Minneapolis, MN | June 14 | Omaha, NE | June 26 | Washington, DC | June 26 |
| Detroit, MI | June 19 | Minneapolis, MN | June 21 | Providence, RI | June 14 | Washington, DC | June 26 |
| Fl. Wayne, MI | July 11 | Montreal, PQ | June 10 | Richmond, VA | June 21 | Wilmington, DE | June 21 |

I'd like to attend your seminar on _____ (date) in _____ (city).

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

Phone () _____

Mail to: Cullinet Software, Inc., 600 Blue Hill Drive, Watwood, MA 02250-2250. ATTN: Corporate Meetings. Cullinet Software products are designed to run on IBM 300-370, 3032 or 4333 or plug-compatible computers.

CV 1-88

Database: Cullinet

© 1984 Cullinet Software, Inc., 600 Blue Hill Drive, Watwood, MA 02250-2250.

SPECIAL REPORT

System launches time savings for Nasa

HOUSTON — A fourth-generation language and integrated data base management system package is providing productivity gains at the National Aeronautics and Space Administration's (Nasa) Johnson Space Center here.

Benzon, a software product from Bencron Systems Corp., based here, has been running on several of Nasa's Harris Corp. and Gould, Inc. SSI Division micro- and mini-computer since early 1980. Located in Nasa's training division, Bencron is being used by the flight personnel training group for a number of tracking and reporting applications.

Significant productivity gains have been realized since the installation of the system over four years ago. According to Raul Mejia, the project manager, "During these four years, the software package has paid for itself many times in the amount of time it has saved as in developing and maintaining several application systems, when compared with equivalent systems that may have been written in Cobol or Fortran."

"We estimated that during the calendar year of 1980 alone, we saved 120 man-weeks of development. That is, we developed in 63 man-weeks, using Bencron and associated report writer and screen routines, what would have taken 183 man-weeks using a more traditional set of software tools."

More recently, a project was completed during the first of 1984 to Bencron training facilities usage given a particular flight project load. Flight schedules for future missions are also generated with the application. Results are plotted on a Versatech V-80 as well as on-line or printed.

Mejia said, "That application took a programmer and myself three weeks to complete with Bencron. Our analysis had estimated eight man-months in Fortran." Translated into dollars, it was a savings of over \$75,000, he said.

Nasa's applications under Bencron include a training records system used to keep track of all the training given to astronauts and flight operations personnel. Another application keeps track of the personnel assigned and time used in various projects within the Flight Operations Directorate. Both operate on the Harris 800 computer.



An application on the Gould/SSI SSI/80 system is a change request system used to keep track of all discrepancies and new requirements submitted to one of the computer installations for flight simulation.

A user as well as manager of the Bencron system, Mejia said about various productivity features: "The language is very

concise directives. In a few statements you can do what would take many times that many lines of Cobol or Fortran code.

"Another very big time-saving feature is the interactive definition of the data base through the screen pointing process. It cuts down on the time and headache involved in using a data base definition language that must be linked or integrated to other subsystems like the data dictionary and the screen forms. Bencron does

all that automatically.

"Equally as important as the reduction in coding time is the ability to prototype with the system. A screen and several processes can be quickly written and then shown to end users to get immediate feedback on system design and function. Also, processes can be tested on-line immediately and in whole or in part since the code does not need to be compiled or linked before it will run. That saves time in a development mode."

An unexpected area of productivity improvement for Nasa came in the area of maintenance and end-user computing. According to Mejia, "Greatest savings are realized daily in the area of maintenance because the user can do many of the functions that would normally require a skilled software person. The software specialist benefits too, though, because the Bencron language is a lot easier to maintain than traditional languages."

"Examples of end-user maintenance include writing new reports or modifying old ones, creating or modifying terminal screen formats, writing programs to provide new information and so forth. The report writer, for instance, is very easy for non-programmers to use... and users with little training can write [most] standard reports themselves."

Three Reasons System/Manager Stands Alone

No other DOS/VSE resource management system comes close to Corvid's System/Manager for overall ease of use and hardware efficiency. It's the complete resource manager. Because of three perfectly integrated components.

Improves disk space and disk file control. Increases capacity by up to 50%.

Controls tape allocation and usage. Minimizes critical time, ensures security and integrity.

Reduces job stream set up and maintenance. Streamlines operational efficiency and throughput.

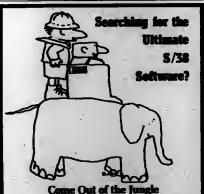
In just 15 minutes, System/Manager can be up and running, paying for itself. And its modularity means you won't outgrow it. It won't outgrow you. We'll even let you prove all this in your own environment for a full 27 days.

Write or call for our Cost Analysis/Justification Worksheet and detailed information.

Offices in Boston, Chicago, Montreal, Also in London, Amsterdam, Düsseldorf, Helsinki, Sydney, Munich, TX 750-27070

C

Corvid



Designed only for the S/38, the Finance/38 modules respond through on-line report writers. Flexible budgeting & user defined structures.

YES! SEND MORE INFORMATION TODAY:

Name _____
Title _____
Company _____
Address _____
Phone _____

GL & AP Available now; AR, Payroll & Fixed Assets following soon! Don't get stuck with a white elephant. Call or write today.

NGS

NEW GENERATION SOFTWARE, INC.

343 Lancelotti Street, Rossmore, CA 95070 Phone 916 935-0900
Outside California Call Toll Free 800 824-1228

Don't blame structured programming

Traditional academic approaches neglect practical considerations

By Jeff Thompson
Special to C&W

One of the more widely taught design and coding techniques is that of structured programming. It has been hailed by academics as one of the few truly logical approaches to program design and an approach that must be religiously adhered to as a demonstration of professionalism. Unfortunately, structured programming as taught has served to decrease program readability and subsequently has increased maintenance cost.

Structured programming was developed in the late 1950s as a method to simplify program structure. Simplified structure, it was believed, would aid in proving program correctness, which would decrease debugging time and effort. The desire to prove program correctness has since faded. The continued use of structured programming is due to its supposed enhancement of program readability and programmer productivity. Productivity is influenced in the initial design, coding and testing stages, but the maintenance aspects are not considered in teaching structured programming. Maintenance, however, is typically the largest cost over the lifetime of software.

Thompson is a programmer/analyst and project leader at Ball State University in Muncie, Ind.

These constructs and limitations have resulted in decreasing readability and increasing long-term maintenance cost and program inefficiency.

If structured programming were to be applied in terms of enhancing maintenance, substantial long-term cost savings could be realized.

Structured programming achieves its benefits through limiting control structures. The only control structures allowed are simple sequence, selection and iteration. Simple sequence is the process whereby statements are executed in consecutive order. Selection concerns itself with the action taken resulting from the evaluation of a condition. Iteration is the process of controlled looping. A final though not inherent aspect of structured programming is that of single-entry/single-exit modules. In other words, there should be only one point at which a module may be entered or exited; branching out of a module is prohibited.

As originally defined, structured programming can be beneficial in enhancing productivity, program readability and program predictability. The impracticality of structured programming stems from the interpreta-

tion being used in the classroom. Universities and technical schools have propagated such bastardizations of the original intent as one-time performs, complete elimination of the GOTO statement and unnecessary nesting of IF statements and performed modules. These constructs and limitations have resulted in decreasing readability and increasing long-term maintenance cost and program inefficiency.

Structured programming constructs concerning simple sequence (modularity), selection, iteration and single-entry/single-exit modules can enhance readability and subsequent productivity. The disadvantages of structured programming are not inherent in the technique, merely in the methodology being taught in the

classroom.

The following guidelines should be utilized to integrate classroom training with practical reality:

- Modules of code that are performed only once should not be used. Instead, the code should be directly inserted into the program flow.

- GOTO statements are allowed under the following constraints:

- All GOTO statements must be forward-branching.

- All GOTO statements should terminate at a module exit.

- No GOTO statements should ever transfer control outside the module in which they are executed.

- Deeply nested IF statements should be replaced by several simplified IF statements using forward GOTOs to branch to the module exit.

Practicality and maintenance concerns should remain the primary determinants in the use of structured programming or in any design or coding technique. By observing practical, instead of academic, constraints, more easily maintainable programs can be written while still achieving the benefits inherent in structured programming.

SPECIAL REPORT

TEAM from SR/36

The design should explain the procedural steps in non-technical terms rather than in terms of the target language. Statements that are close to code should be avoided except, where absolutely necessary.

A short glossary of terms should be developed and used to avoid technical phraseology. If, for example, the target language is Cobol,

use DO rather than PERFORM. Good, plain English makes the best design language. This is essential because the design becomes the documentation. By using plain English, the documentation can be comprehended by nontechnical members as well as team members at a later date.

Most program design tasks require a maximum of two hours. Very complex designs may take longer, but when

this occurs, team members should be alert to the possibility of dividing the design into smaller, more manageable tasks. It is far less costly to evaluate the design now than to develop and implement an ill-conceived concept.

When the design is completed, it is turned over to the programmer for coding. This programmer, it is hoped, has been involved in the design process, thus eliminat-

ing the need to acquaint him with the design. However, if the program must be assigned to a person outside the design team, the team should conduct a briefing with him before coding begins.

The programmer enters the design into the procedure portion of the program, using a text editor. The design is entered exactly as constructed by the team. This is documentation—not coding.

Design statements should be entered as comments. Statements entered in this manner create a simple list that becomes a program coding template upon which the programmer will insert actual code. The design is now ready for the next step—coding.

Using the template, or program shell, created in the previous step, the programmer codes the program by placing language statements between the comments. Do not remove the comments after coding; they should be left in to ensure future understanding.

Programmers are not permitted to add or delete a program module or to make major changes without consulting the design team. If, for some reason, a programmer finds that a design change is required, the team must review the situation and either make a design change or resolve the unclear details. This serves two purposes. First, it keeps a program design from being altered incorrectly by the programmer, and second, it provides feedback to the design team, ensuring that they are fully aware of any design errors made.

When the program has been completely coded and the programmer has an error-free compile, a walk-through of the code is held with the design team. This is done to ensure that the program code actually does adhere to the design. This additional effort has proved to be beneficial in that it identifies errors due to misunderstanding the design. From this point, the program goes through unit and system testing.

Less time spent

The total amount of time expended in developing team-designed programs is less than that of individually developed programs. A typical program task can be team-designed with a manpower investment of three to six hours. The same program designed by an individual will typically consume eight to 12 hours if no serious errors are made. The team process develops a correct design before coding, whereas individually developed programs catch the mistakes after coding.

The design quality shows dramatic improvement through the use of team design. Team members rapidly develop into sound, knowledgeable designers. This applies to experienced as well as inexperienced personnel.

Team design breaks down the traditional isolation and introversion barriers often encountered in programming. It allows the programmer to function and interact within a group, strengthening his ability to relate to people.



NOMAD2 The Smarter Software

If you're presently evaluating FOCUS, take a closer look at NOMAD2 and you'll be surprised at how smart software can be.

Whether your comparison is based on specific features, the scope of the product, or the sheer power it puts into your Information Center or your development activities, NOMAD2 is smarter.

Relational? Yes! Interactive? Yes! English Commands? Yes! Procedural? Yes!

Analysis? Yes! Multilayers of Security? Yes! Modeling? Yes! Statistical? Yes! Graphics? Yes! Runs on VM? Yes! Runs on MVS/TSO? Yes!

And we don't just drop a tape on you and walk away. Education, documentation, service and support are part and parcel of the NOMAD2 offering. Talk to us before you make your decision and your decision will probably be the smarter software... NOMAD2.

NOMAD2... Experience the difference

D&B Computing Services

A Subsidiary of
The United Technologies Corporation

For more information write to: Roger Cox, D&B Computing Services, 127 Denbury Road, Wilton, CT 06897, or call Roger Cox at (203) 792-2511

NOMAD2 is a registered trademark of D&B Computing Services

System beefs up Hardee's DP operations

ROCKY MOUNT, N.C. — With 600 company-owned stores and 1,400 franchisees, Hardee's Food Systems, Inc. has witnessed growth from a single restaurant in 1960 to over 2,000 restaurants today, ranking as the third largest fast-food hamburger chain in the U.S.

Don Gladwell, director of systems development for the firm, explained that increased pressure for productivity and responsiveness to individual restaurants have prompted both the acquisition of new software and the installation of new hardware.

Gladwell noted that the combination of a staff of 14 in systems development, with multiple and increasing application requirements, prompted a search for a tool to increase programmer productivity.

DP division

Hardee's corporate DP division includes the 14 people in systems development, with 37 people in technical support, communications and operations. Franchisees handle their own data processing, while Hardee's DP division supports the company-owned stores.

The division provides services to all financial departments, including accounts receivable, payroll/personnel and others. An IBM 4331 and an IBM 4341, both under DOS/VSE with VM, are used to support standard business applications for financial departments. The company is now installing Digital Equipment Corp. VAX-11/780s in each of six area offices and one at corporate headquarters to service the marketing and restaurant operations.

Gener/OL, an interactive on-line program development system designed for use under CICS, was purchased in October 1983 from Panoptic Systems, Inc. Prior to the purchase, a number of CICS productivity aids were evaluated.

One package

"The main reason for our choice was that no CICS expertise was required for using Gener/OL, while all of the other packages required that knowledge. With Gener/OL, everything is done within one package, and there is no need to create links to CICS command-level code," Gladwell said.

Gladwell said that Gener/OL was used to develop a marketing system for tracking sales promotions that are done by the company. A recent promotion handled by the system was related to plush toys, where a kit was sold to each restaurant. (Both franchisees and company-owned restaurants were obligated to pay for them.)

The individual restaurants could choose from a variety of displays and could buy as many as needed. The orders were entered into a sales order system, and an invoice was generated. Both the entry of sales orders and any inquiry into the open order file were accomplished using Gener/OL.

Gladwell said that prior to the use of Gener/OL, the entire procedure was a manual effort, which did not allow a timely response to individual restaurants.

"The new marketing system is much more efficient as both a tracking mechanism and as a tool for quick

response to the restaurants involved," he noted.

Increases in programmer productivity may be directly linked to the use of Gener/OL, Gladwell added.

Gladwell pointed out that Gener/OL eliminated discrete steps. "We used to have to format under IISB and write CICS command-level Cobol programs under another product. We had problems linking the two. We have eliminated the passing of attributes back and forth by using Gener/OL."

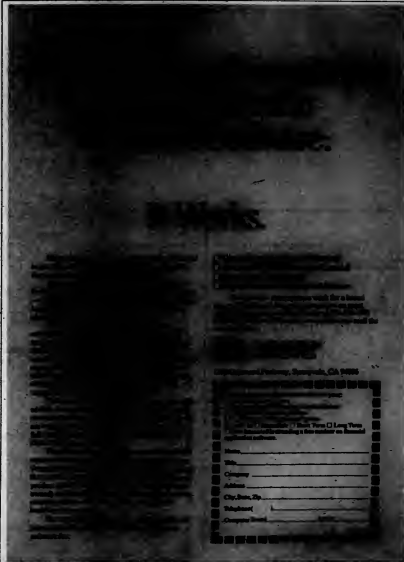
In addition to the new software, Hardee's is also installing new hardware.

"We are now putting in DEC equipment [VAX-11/780s] around the country, one in each [of the six] area offices," Gladwell said. "Each area office is treated as a separate company and has up to 200 restaurants that it is responsible for. One VAX will be installed here at corporate, and the corporate unit will control the entire network. There will be no operators in the area offices — the entire network will be run from corporate using Decnet."

"We are decentralizing the reporting for restaurant operations so that we can get more timely information to the field," he added. "This allows

each area office to identify the problems in its business more quickly. For example, if management has too much labor in a unit, compared with sales generated, or if a manager has too much menu waste, the information would be relayed to the field much faster."

"We are in a very fast-paced business, having gone from one restaurant to over 2,000 in a little over two decades. Gener/OL allows us to provide our users with viable systems in a shorter time frame, despite the tremendous growth of the company, and the DEC equipment will help to make reporting even more efficient."



SPECIAL REPORT

Development life cycle has 10 milestones

By Guy Sathian
Spokane, Wash.

There are 10 major milestones in the systems life cycle development process:

- Defining goals.
- Representing the design of the application.
- Preparing for production of the system.
- Producing the system.
- Testing the system.
- Parallel testing the system.
- Documenting the system.
- Installing the system.
- Maintaining the system.
- Making major enhancements to the system.

It is most important to define goals, and the end user of the application must be deeply involved in this process. Most often, the scenario that occurs in an application development effort is as follows: The systems development people meet with the user, discuss his needs and then produce a document defining the goals of that application. This document then becomes a target toward which the systems develop-

ment activity drives.

It is very important that the user be directly involved in, and contribute heavily to, the defining of those goals. The user must understand what the proposed system is, and there must be a feedback

mechanism built in to allow goal definition to change through the early development cycle.

Once the initial goal definition has been achieved, produce a document that contains those goals. This document must be agreed upon by both the user and the application development group.

Next, analyze the system so that its design can be defined. To do this, decompose the system into its functional components. There are many methodologies that expose different forms of decomposition, any of which, if ap-

plied with discipline and rigor, will work well within a given organization.

Two major approaches are chronological decomposition, where a development or application is viewed along a time line within an organization.

Functional decomposition, where development of the activity within a single area is looked at.

It is next desirable to do a data flow analysis. After this, the system can be broken into functional data processing groupings, such as reports, screens, data base segments, files, programs or processing modules.

First, prototype the application by painting end products, such as screens and reports, in a form that can be understood by both the end user and the DPER. Continually refine these and products until the definition is complete and satisfactory to the end user.

System development

The next phase is the preparation for system development. Application generators enable quick response to changes and production of applications that can be tested relatively easily and that can then be moved quickly into production. They also produce oper-

ational documentation and user-interface documentation before the actual system production phase itself. Debugging and documentation is as significant as debugging the programs.

The production phase con-

Technical documentation of a system is critical to the ability of an organization to maintain the system on an ongoing basis. It should be produced by the application generator and contain such information as a complete data element cross-reference and an index that is automatically produced.

The system can then be brought into production relatively painlessly.

System maintenance

Next comes the system maintenance phase. This typically involves the areas of error correction; oversight correction; minor modifications to the application to make it more responsive to the user; and global modifications when it is discovered, for example, that a particular field on a report is not large enough to hold the data that is generated during the use of the system.

Then, inevitably, comes the major system enhancement phase.

Not infrequently, once an application is brought on-stream, a new string has to be added to the application to handle a new area of processing that was not originally included. These types of major enhancements are always more difficult and more expensive using traditional methodologies than application-enabling tools.

Finally, we have the area of redevelopment of the system. Even though a system is built in a modular fashion, and an application generator is used, there comes a time when it may be necessary to reimplement that system. An application generator will allow us to take those parts of the existing system that remain useful and bring them forward into the new system at almost no cost.

Gutman is president of Generalized Systems, Inc., a New York-based company that markets application generators.

Need general accounting software for IBM System/38? We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES
They include on-line systems using data base management; menu driven, user friendly program screens in PC/BI, the System/38 language; and integrated modules. Their

benefits ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES:
These include include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Paid Assets/Personnel/Plant Purchase Order/Order Entry/Inventory Control.

SERVICE FEATURES:
Fully documented and supported. On-site training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55411
(612) 378-2653

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

DISCOVERING HIERARCHY CHARTS?

H-Chart has been producing them for years. Since 1976, to be exact. But have no fear. You're just in time for the success of H-Chart. See it, H-Chart, that is, H-Chart II, is now available from NOS.

In addition to producing hierarchy charts from COBOL source code, H-Chart II helps programmers (and managers) track those nasty GOTOs. And should a programmer slip up, however he/she, the diagnostic report locates any non-executable code and even pinpoints and spotlights tell-thru code.

Curious?

Call or Write:



NATIONAL DATABASE SOFTWARE, INC.
5498 Centerbrook
West Bloomfield, MI 48022
(313) 651-6900



SPECIAL REPORT

People skills extend DP effectiveness

Technical prowess not sole talent needed in career advancement

By Paul A. Martino
Special to CW

DP has always been and has always projected itself as a highly technical area. The need for tight logic and precise definition has led to the extensive use of technical terms that add to this image. While a technical vocabulary has been quite useful in exchanging ideas about technical developments in the discipline, it has had two undesirable side effects.

The first of these is that it conveys DPers as an aloof, arrogant and almost mystical group to anyone outside DP. This helps to contribute to less desirable attitudes toward DP—attitudes ranging from apprehension to overly optimistic expectations.

The second difficulty is within the discipline itself. The constant need to keep abreast of the advances in hardware and software technology causes an overemphasis on the technical tools of the trade at the expense of others.

Ambassador of change

On a broader plane, the role that DP serves within the user community is that of an ambassador of change. It helps the user community accomplish its objectives more effectively by bringing it information technology. It interacts with a community whose skills and knowledge are different from its own and that has a vastly different vocabulary. DP serves as the interpreter of information technology for this community.

On occasion, it finds itself in the middle of a conflict of views held by users of divergent purposes. Many times it is called upon to communicate under difficult and stressful conditions. All of this takes as its end the bringing about of some useful and beneficial change.

It is important to understand the foundation from which DP careers have developed. These careers typically proceed from the more technical at the programming level toward increased human interaction at the management and analysis levels.

Different talents

Talents that serve a programmer well, such as logic and strong attention to detail, can be an impediment and a source of frustration while attempting to make the transition. Programming is logical and predictable, but users are emotional and spontaneous.

Moreover, a failure while engaged in programming tasks is an expected and easily dealt with phenomenon. When similar failures occur in the more human activities, however, they are often looked on as a personal failure or disgrace. The emotion associated with this type of failure often clouds the ability to deal with it for what it really is: a bug in the human system.

Where new technologies have been concerned, such as the introduction of CICS into a shop, the importance of adequate training is obvious. A vast range of alternatives, from semi-

nars to textbooks, to programmed instructions and to mixed media sessions, is readily available from which to choose. Nontechnical skills have been dealt with less completely, and are often even difficult to identify as skills. Meetings are such a commonplace occurrence that the skill involved might not be obvious to someone who has to run one for the first time.

An attempt to categorize the various skills required as one advances through a DP career leads to a rather impressive list. In part it would include: writing, speaking, present-

ing, listening, interviewing, planning and organizing, negotiating, dealing with difficult situations, researching and conceptualizing. Each skill can be a crucial ingredient to the successful completion of a project. Yet it is difficult to develop a list in which the training in these areas is technical training.

The collection of skills necessary to improve performance in these aspects can be learned by methods other than trial and error. The challenge to the DP industry will be to locate and establish adequate training in these nontechnical areas.



Self-dFENSE™ for EDP managers.

The micro invasion has begun. And, chances are, you've now got a lot of different people in a lot of different departments using a lot of different micros.

Now there's a way for you to control and maximize the benefits of all the different micros in your domain.

Fight back with dBASE II®

dBASE II is the relational database management system from Ashton-Tate that enables you to manage your micro-based corporate data resources with the high level of consistency and sophistication you've enjoyed with mainframe and minicomputer systems.

Armed with dBASE II and the dBASE II RunTime™ program development module, you can write programs which will enable micro users in each department to "do their own thing" while creating complete database consistency throughout the company.

dBASE II is a powerful, flexible way for you to effectively manage the micro proliferation.

Help is here.

If you'd like to know more about how dBASE II and RunTime can help you win the micro management battle, contact Ashton-Tate today. 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 217. In Colorado (303) 799-4900. In the U.K. (0908) 568866.

ASHTON-TATE™

dBASE II is a registered trademark and RunTime is a trademark of Ashton-Tate. Suggested retail price for dBASE II is \$900. © Ashton-Tate 1984

Martino is vice-president of Kieffer, Martino and Associates, Inc., a Chesham, N.Y.-based consulting firm.

Source code library maintenance stacks up

By Richard J. Schmitt
Sparks to CWT

While concentrating on productivity enhancements in creating new source code, many programming supervisors ignore a major concern of their technical staff—the management of existing code.

What good does it do to generate new systems with state-of-the-art tools if we then lose or inadvertently modify the resulting software?

Although source code library management functions lack the glamour and glitter of application generators, they substantially impact the 50% to 80% of the total programming work force assigned to program maintenance.

In fact, if proper library control can save a modest 5% of the maintenance staff's time, the savings to the total programming effort are equal to a software development tool that makes system developers 10% to 20% more efficient.

Mismanagement of source code is not a particularly new issue; losing sets of instructions was with us long before computers. (Music historians estimate that half the works of J.S. Bach were lost through the carelessness of one of his sons—perhaps the predecessor of the modern-day contract programmer.)

Today, few maintenance personnel will guarantee that they can find source code corresponding to each production, load module in even the most critical of a corporation's systems.

Unlike most other software concerns, the situation of missing or inaccurate source code is becoming worse. Ironically, this is due to the fact that programmers are becoming better at what they do through the use of more sophisticated tools. A few years ago during the dark ages of code creation, programmers had few tools: a keypunch machine, a line editor of sorts and probably a library maintenance tool. This very lack of tools simplified library maintenance.

Nowadays, cheap CPU and disk space, coupled with powerful on-line editors and other programming productivity tools, seriously threatens library integrity. We now have situations where several slightly different versions of production programs reside in individuals' private libraries. When two or more programmers attempt to change the same production

load code module, changes made by the last programmer will overlay any changes made by his colleagues in the time period since the last update's copy of code was extracted from the library.

This update-all phenomenon is the newest threat to the integrity of production

Music historians estimate that half the works of J.S. Bach were lost through the carelessness of one of his sons...

source code, but other problems remain that have been with us since the early days of program maintenance:

■ Why was source code changed? Knowing the reason for changes often makes even the most obtuse code understandable to those who must perform additional maintenance in the future.

■ Who changed the source? Programmer skills vary. When things go wrong,

We wrote the
book on portability.
In nine
different languages.

| | 8086/286/386 C/M MP/MT | 8086/286/386 C/M-48 Overcast C/M* | IBM PC DOS | IBM MS DOS | MC-68000 C/M-68K |
|----------------------|------------------------------|--|---------------|---------------|---------------------|
| FORTRAN-77 | | | | | YMA |
| C BASIC Compiler | | | | | |
| Pascal/MPT+ | | | | | |
| Lotus 1-2-3/COBOL | | | | | YMA |
| PL/I | | | | | YMA |
| C | | | | | |
| Assembler Plus Tools | | | | | |
| Access Manager | | | | | YMA |
| Display Manager | | | | | YMA |
| Interact/SP | | | | | |
| CORSE/Assembler | | | | | YMA |
| Personal BASIC | | | | | YMA |
| Dr Logo | | | | YMA | |



Schmitt is a data base administrator for Exxon Corp. in Houston.

impressive returns on modest investment

changes made by certain members of a project team will be examined with more scrutiny than those made by more reliable maintenance staff.

■ When was the change made? A programmer called in the middle of the night to repair a once-reliable module

will first check the most recent modifications to see if they have inadvertently triggered the same situation.

■ What lines changed? Analysing these is usually more effective than

tracing through entire programs. *... perhaps [Bach's son was] the predecessor of the modern-day contract programmer.*

increase their output so dramatically in recent years?

How can this dilemma be resolved without depriving programmers of the productivity tools that have allowed them to

Fortunately, a number of steps are available to most shops large enough to suffer from the problem. The answers often lie in applying software capabilities commonly found in medium to large programming environments.

First, examine the project's library policies. Chances are they were formulated back in the line-by-line update days and can no longer handle the complexity of the update-all editors.

Second, use existing software to ensure that source and load code modules are synchronized.

Third, have project management make sure that the staff is aware of and uses the source code audit trails available in their present editors.

Additional steps may be taken that will require more resources than simply making use of existing software. The outlay is usually quite modest when compared with the \$60,000 to \$200,000 spent to purchase development productivity tools.

Consider purchasing a program that compares two versions of source code. These are readily available on the market and are reasonably priced. When a programmer puts a modified program into production, this software will compare the updated version with the current production source.

Better yet, keep the output of these runs in a file (either on-line or attached to the program's folder in the documentation library) so that a line-by-line change history for the program is maintained.

Build a log of why the program was changed (such as a reference to a project control number), who changed it and the date it was changed. This could be something as easy to implement as a simple copy step in the production compile procedure or as sophisticated as an update to the program's information on the installation's data dictionary.

As much as possible, integrate these procedures into the programmer's existing tool kit. For instance, if your shop has taken the trouble to create screens to compile and link programs, take the additional step to update the log suggested above and run the source code compare. This way, the project team can have the benefits of enhanced library control without expending any more effort.

Finally, consider what it would take to ensure library control. The responsibility for updating source code could be rotated among project team members.

To every software developer who'd written off portability as an impossible dream, Digital Research humbly announces a few monumental breakthroughs.

We not only offer languages that are portable from 8 to 16 to the 32-bit chips of the future, they're portable across all popular operating systems, too. What's more, we supply the broadest range of quality languages and development tools available today. And will tomorrow.

So rest assured. Whether you design applications at a major corporation, plan to become a major corporation or just qualify as a hobbyist, you only have to write it once.

Simply pick the Digital Research language that's right for you. From Personal BASIC™ to Digital Research FORTRAN-77™. The newest member of our remarkable family.

To complement languages, we offer a complete workshop of development tools. Our Display Manager™ and Access Manager™ simplify the design of screen displays and data bases. So you spend less time and effort.

If you write in COBOL, our Animator™ source level debugger will get your software running in record time.

And for programmers skilled with IBM mainframe SPF, we offer micro/SPF™. An editor that helps turn your invaluable experience into valuable new software applications.

At Digital Research, we work as hard for you after the sale as we do to get the sale. With backup like quality documentation, software updates and a phone line to our technical support team.

With so much productivity and service to draw on, it's small wonder IBM chose our languages for its IBM PC, XT and the new IBM 3270/PC.

For more information, or the name of the Digital Research retailer nearest you, call 800-227-1617, ext. 400. In California, 800-772-3545, ext. 400. Or call your IBM representative directly.

**DIGITAL
RESEARCH**

micro/SPF is a trademark of Paces Systems, Inc. Animator and Animator II are trademarks of Micro Focus, Ltd. SPF is a registered trademark of International Business Machines Corporation. The Digital Research logo and booklets are either trademarks or registered trademarks of Digital Research Inc. © 1984 Digital Research Inc. All rights reserved.



Secret to cutting backlog? Write less code

By Russell Lee Bloom
Special to CWR

One almost universal, but only moderately successful approach to reducing application backlogs has been to improve the productivity of scarce technical resources. A more promising approach to meeting user application needs may be to reduce substantially the amount of new code needed to satisfy these needs. Such application-enabling techniques, to

Bloom is a senior principal of American Management Systems, Inc. in Arlington, Va.

Other things being equal, the less code written to achieve a specific level of systems support, the less risk, cost, elapsed time and staff frustration. It is important to note, however, that other things are rarely equal.

use a phrase that seems to have originated within IBM, are intended to reduce the amount of new code written, rather than merely expediting the production of new code.

Other things being equal, the less code written to achieve a specific level of systems support, the less risk,

cost, elapsed time and staff frustration. It is important to note, however, that other things are rarely equal. Many of the techniques described below substitute increased consumption of computing resources for reductions in the personnel resources needed to achieve a certain level of

user support.

There is nothing very mysterious about finding ways to write less code. You can:

- Convince the user not to want (or need) a new application.
- Reuse old code — your own or someone else's.

- Use simple tools (remember how levers work?) to multiply the work value of any code you write.

- Get someone else, perhaps your users, to write the code for you.

The key to successful application-enabling is to build these concepts into your systems development life cycle methodology. Custom development or even package installation projects should not be initiated unless the new application is really needed. And at every stage of the life cycle, you must ask yourself what alternatives exist to developing new code. Thus, application-enabling techniques parallel, in some sense, the systems development life cycle.

The most obvious solution to the problem of how to write less code is to eliminate from the backlog all but the essential applications. Strategic systems planning is the process by which an organization identifies and prioritizes its major systems development objectives. By explicitly aligning systems development priorities with the organization's business strategy, we take a critical first step toward reducing the amount of new code to be written. To repeat, if you don't develop unnecessary applications, you will not be called upon to write (and maintain) worthless code.

Where an application is justified, there are several possibilities for developing it without writing any code or by writing only a small amount of simple code. Application software packages have been available for nearly 30 years, and many routine business and system functions are very adequately supported by such packages. Before deciding that an application is so unique as to obviate using any existing code — a common attitude among many in-house analysts and users — consider the many flavors of software packages and reusable in-house code.

Currently available commercial applications and systems software can be divided into three general categories. Traditional software packages perform a well-defined set of functions with minimal installation options. Contemporary software packages perform a well-defined set of functions subject to many table-driven, user-defined and/or installation-specific options. And adaptable software packages perform a flexible set of functions subject to many table-driven, user-defined and/or installation-specific options.

Written to be customized, contemporary packages have well-documented source code constructed to support low-risk user modifications. Such packages also use reference tables to remove from the source code the most frequently customized functions, such as report headings and, in some cases, formats, message code literals and severity levels; data element names; field lengths; data types; edit rules (including pointers to other reference tables of valid values and code translations); and so

See CODE SR/50

Why is it important to you that CONSCO's financial software is different?



Because CONSCO's financial software systems were designed for accountants by accountants. Today's end users need more information about their business operations than ever before. That's why we designed our systems using what we call "Financial Technology"—the ability for a user to enter, analyze, and report meaningful business information without data processing limitations or restrictions. The outcome—two unchallenged financial systems designed just for you.

Accounting Information System

A complete General Ledger system that can provide many more applications than just general ledger.

AIS was designed at the outset as a full blown on-line information system to your entire company can now be reflected in one integrated system. Now managers at all levels can get the information they need to really do their job.

You can even do such things as work order management, construction work in progress, cost control & analysis, project reporting, encumbrance accounting, as well as all those special things that just can't be labeled.

Consolidation System

Finally a financial system designed specifically for consolidation accountants.

CONSOL fully automates those time consuming and tedious tasks like reconciling intercompany accounts and producing management reports. This saves you time when you need it most—at the end of the month when you're under the gun. Spend your time doing meaningful analysis instead of number crunching. Not only will you get better results, you'll save money.

CONSOL's unique architecture produces results for you up to 200 times faster than our competitors. This means you get your information now.

Why is it important to you that our company is different? Because you are different. And CONSCO cares about you. We send our people to you. We work with your data and your deadlines at your site to give you results that are put directly into production. We call this the CONSCO Insurance Policy because it insures that your job gets done. You'll see that our service is different too!

If you care about you, the way CONSCO cares about you, call us at (212) 586-8701 or write

conesco

888 Seventh Avenue, New York, NY 10106

You'll never have to begin at the beginning again.

Introducing The Masters.

The world's only series of reusable software for application program development.

The Masters are the very first—and the only—integrated series of reusable software productivity tools which support the entire application software development cycle.

The development of the Masters is based on the fact that only 20 percent of any given program is application-specific. Approximately 60 percent of each program is comprised of logic structures common to all programs, and the remaining 20 percent of any given program is comprised of generic—or non-application-specific—functions.

The Masters automatically generate these common program functions throughout the program's life cycle.

The result. The Masters automate up to 80% of the program development process. And cut development costs by 80% while increasing productivity by up to 400%. Unheard of! Yes. But not for long.

Now available in the Masters series are:

PrograMaster System

The PrograMaster System exploits the fact that application program functions are repetitive. These functions are organized and easily accessible to the developer so that they may be used to produce new application software.

PrograMaster™ produces this software in structured, documented COBOL source code for IBM OS or

DOS batch processing environments. PrograMaster/OL™ integrates the screen functions of PrograMaster/SG™ and builds complete source IMS DB/DC™ COBOL on-line applications. Integrating the reusable portions of systems so that the entire application can be produced from standard structured designs, logic structures, program modules and source code.

Imagine. Between 60 and 100 percent of the code needed to develop the new application is provided by the PrograMaster system. You'll receive a fully structured, documented COBOL source program. Complete and tested.

Further, program quality improves due to highly structured efficient code. And testing new programs becomes a predictable, manageable process.

PrograMaster/SG™

PrograMaster/SG is the screen generator portion of the program. It simplifies the design and coding of screens used in on-line applications. Through a simple painting process, screens are created in minutes. Automatically.

ManageMaster™

ManageMaster gives management the control it needs with data processing. ManageMaster lets you control the libraries of both your batch and on-line systems. It updates you on changes in the programs, monitors

and cross-references files, and provides an extensive documentation system of the source code library.

With ManageMaster, you have the control you need right where you need it. At your fingertips.

Add it all up and you can improve productivity 15 percent in the design phase, 100 percent in the implementation phase, and 150 percent or more in the maintenance phase.

And also give programmers and analysts the freedom to spend more time on the creative aspects of development, and give MIS and data processing managers greater control over the methods by which application programs are implemented and maintained.

There's a whole lot more we can tell you about our unique Masters series. Information that you can't afford to be without. All you have to do is fill out and mail the coupon. Or call 617-924-0052.

I never want to begin at the beginning again. Tell me more about the Masters.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____

Mail to: Director of Sales
Master Software, Inc.
62 Pleasant Street
Watertown, MA 02172

Master Software

The world's first fully reusable software company.

PrograMaster/OL, PrograMaster/SG, and ManageMaster are trademarks of Master Software, Inc. IBM DB/DC is a trademark of International Business Machines Corporation.

SPECIAL REPORT

Prototyping gives users more enthusiasm

For DP, working model serves as tangible and flexible aid for application development

By Pat Monaghan
Special to CW

With all due respect to the proponents of structured methodologies and to those software consultants who perpetuate the methodology propaganda, spending more time on specification design is not the solution to improving software performance and application development efficiency.

In spite of the wide acceptance of such methodologies, industry experts such as James Martin point out that 83% of the effort spent debugging an application is a typical MIS department today is still spent eliminating bugs that were introduced during the requirements specification process. Another 17% will be spent on bugs introduced during detail design. Only 1% of the debugging is spent on bugs created in the coding phase.

Merely increasing the user's up-front involvement and spending more time on traditional design will not solve that problem. In fact, we already spend too much time on design specifications.

Increasing the efficiency of the application development process — and the usability of the finished applications — boils down to improving the efficiency of the communication process between the people who are going to use the system and the people who are going to build it.

Think back to the last project you started. Remember the enthusiasm and excitement of those first few meetings. DP was anticipating a new challenge, and the users were happy to be getting their system finally underway.

Now think about how quickly the excitement faded and how rapidly the users were drained of information. Remember how tough it was to overcome the spotty toward specification review meetings; how, even when the users came to the meetings, no one had really read the specifications, and their sign-off often did not really signify either understanding or approval.

Increasing up-front user involvement certainly will not remedy that situation. The difficulty with the traditional application development life cycle is that both users and DP professionals get tired of intangibles. We all want to see something that we can

Increasing the efficiency of the application development process — and the usability of the finished applications — boils down to improving the efficiency of the communication process between the people who are going to use the system and the people who are going to build it.

touch and test and use, something that captures the essence of the design, not just more paperwork that merely describes it.

Change needed

At least unconsciously, DP professionals have embraced conventional design methodologies as such for their value in preserving the mystique of the profession as for their contribution to improving performance. We've got to change our own philosophy, and the change we need is a wholesale commitment to the philosophy of prototyping.

Prototyping allows us to take whatever information we gather during the first few enthusiastic meetings, and instead of coming back with increasingly voluminous and detailed stacks of specifications, we can come back with a tangible application that the user can touch and try. Then the user can knowledgeably suggest changes that will improve system performance, and then we can proceed to incorporate those changes with a clear understanding of what exactly needs to be changed and how it should look at the end.

This method will work since we prototype now. We just call it enhancement and maintenance.

A lot of useful information comes out during the system test and benchmark phases just prior to putting a finished application into production. The information is generated because the user finally gets to see, touch and use the finished product.

For years, DP professionals have lamented the fact — and actually talked themselves into believing — that the reason users do not like finished systems and want long lists of changes is that they only gave half the information in the first place, and at least half of what they gave was wrong.

That is certainly an exaggeration, but even if it were true, after 20 years of experience, maybe we should accept that this is the way it is going to be and change our methods to accommodate that fact.

It is time that DP admits that too often the finished product put into production is really built in seclusion. After the user signs off on a set of frozen specifications, he returns to write code that is really only based on a series of "best interpretations" — our best interpretation of what the user wanted, their best interpretation of what the specs meant, our best interpretation of their comments and questions and so on and so forth.

It is no wonder that most first production versions are nothing more than first prototypes and that the ongoing maintenance and enhancement phases are really just continued prototyping.

Unfortunately, while we are refining the product, the poor user, as well

as the corporation, has to make do with the production prototype until a new version can go through the entire process again.

As long as we are going to prototype anyway, why not make it a methodology, organize it and use it to our best advantage? By definition, an effective application development methodology must:

■ Provide for an iterative approach and allow easy reiteration.

■ Provide for specific and appropriate communication with all departments affected by the development.

■ Provide a system for accommodating changes based on decisions and approvals made in a step-by-step manner.

■ Provide documentation of each step and decision.

■ Facilitate project management by establishing milestones and reporting systems.

The fact is that there are so many reasons for not making an interesting comment on their effectiveness. But accepting and enforcing the rules often cause for more problems than they alleviate.

Structured methodologies all suffer from a fatal flaw. Although they claim otherwise, they do not accommodate change. They are really designed to prevent it. Their basic tenet is to freeze design specifications at some point and to move satisfactorily forward through the remainder of the development process.

That is all right, provided that the specs are perfect, fully describing all aspects of the required system, and that they are completely understood by the user, the analyst and the programmer.

Unfortunately, as Martin's statistic on specification problems highlights, the specifications are far from perfect. They are often misunderstood, and freezing them at any point before the application has actually been tested generally means freezing in problems that will have to be taken out later.

Prototyping is actually the best way to meet all the criteria for an effective methodology.

Together, DP, users and all others involved can touch and feel the tangible application and suggest changes based on what they see and experience, not what they read or interpret. Each change can be tested through interaction, not imagination.

Most importantly, from a project management standpoint, each change is specifically based on decisions and approvals relating to the preceding version, and all can be easily documented.

With prototyping, communication during the application development process is bound to improve because it is based on facts, not fantasies or fallacies. Since the finished applica-

tion will meet the user's needs more precisely, perceived quality and satisfaction will improve, maintenance requirements will drop and the full life cycle of each application will increase.

Steady maintenance and enhancement now typically occupy between 70% and 80% of staff time, successful implementation of prototyping will free tremendous resources to apply against the backlog of outstanding user requests.

By adopting the prototyping approach, users, DP and the entire corporation benefit. By remaining dedicated to the constraints of conventional methodologies, DP will not be able to bridge the gap between user demand and DP resources. The backlog will continue to mount, and user frustration will continue to increase and DP will inevitably and unavoidably lose control of the corporate information processing environment.

There has come

The time has come to recognize the short- and long-term advantages of prototyping and to embrace the new paradigm of total development methodology that makes it a technical and economic reality.

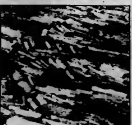
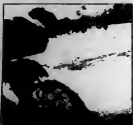
Prototyping is not a new concept, but until recently it was generally viewed as cumbersome. Basic specification simulations could be created relatively quickly, but all they did was show the user how screens and reports looked, not how they related and reacted to one another when actually connected by code. There was no way to be sure of the results that the application would produce. That is just doing the typical specifications without the three-hole punching.

Why go through tedious and lengthy iterations of specifications when more can be accomplished in less time at less cost through a series of working models? Why require users to read specs when they can observe an operational model? Why force them to imagine required changes when they can easily envision them through interaction with the prototype?

Prototyping is the most effective form of two-way communication available to the DP industry. It is time for us in DP to abandon the prejudices and practices of conventional application development and embrace the power of prototyping.

Those companies that do will be on the leading edge of progress within the industry. Those that do not will see the industry pass them by.

Monaghan is vice-president and director of research and development for the Business Products Division of Analysts International Corp., a software development consulting firm based in Minneapolis.



"How I increased user satisfaction with the flick of a switch."



Introducing The Honeywell Solution Center.

Now there's a way you can increase the satisfaction of your end users and improve the responsiveness of your information management system. It's called a Solution Center.

A Solution Center is a user-support facility that enables personnel throughout your organization to do their own data processing, quickly and easily. And it enables you to give them direct but controlled access to online information.

Increases Productivity

A Solution Center features Honeywell's GCOS8 software that ranges from personal productivity and decision support tools to business-specific solutions. So now your end users can build their own spreadsheets, forecast trends with color graphics, browse through online files, and create or revise reports.

Think of how that could increase their productivity as well as their satisfaction. And, by freeing the MIS staff to do more of the significant tasks they were hired to perform, a Solution Center can increase the productivity of your data processing department, too.

Improves Data Management

A Solution Center improves data management by providing consistent information to end users and by eliminating unnecessary application development. It can facilitate the introduction of personal computers. And, best of all, you can tailor it to meet your specific needs.

With a Solution Center, end users get the information they need and you get the control you demand. It's bound to make them a lot happier, and you a lot happier too.

For more information on how a Solution Center can work for you, call toll free at 800-328-5111, extension 2724. In Minnesota, call collect 1-612-870-2142, extension 2724.

Another Big Idea From Honeywell Large Systems

Look to Honeywell Large Systems for solutions to information management problems and for products ranging from powerful computers to comprehensive networking capabilities.

Together, we can find the answers.

Honeywell

SPECIAL REPORT

**CODE** from SW/48

rometer values such as process scheduling dates, current withholding tax percentages and airline overbooking percentages.

The purchase and use of contemporary or adaptive application packages generally reduce the costs, risks, elapsed time and personal frustrations of meeting systems support needs. However, there is always a price for flexibility. Sophisticated reference tables can require considerable leading and maintenance effort. But this approach is far less risky than modifying source code, and users can often be encouraged to take responsibility for leading and maintaining most of the tables.

From the perspective of cost, risk and the containment of elapsed time,

the availability of options means someone must analyze, document, recommend, evaluate and decide upon each desired option. Contemporary application packages go a long way toward meeting organization-specific requirements without developing new code.

There are two general approaches to multiplying the value of any code you do write. Extension software uses your simple code written in the tool's own command language as the input from which it creates (by translation, compilation, assembly or one of several other extension techniques) very substantial functionality. Report writers are a common extension technique.

Conservation techniques are a formal set of design techniques that look for the common functional elements

in an application in order to develop a single implementation of these common functions for use across the application. Resulted data reduction is a very simple case of conservation.

The universe of extension software ranges from the old and familiar to the new and still developing, including:

- Utility programs that provide system or housekeeping functions.
- Report writers and inquiry languages, including graphics packages.
- Data base management systems with which you use simple commands in the application programs to invoke powerful data handling, editing, storage and access capabilities.
- Screen generators.
- Data management and analysis tools.

■ Application generators.
■ Very high-level languages.
However, there is a significant problem currently associated with the use of extension techniques. Until considerable standardization occurs, taking advantage of even a small set of these tools will impose a serious training burden on your organization. Many professional programmers and users will resist using these tools because they quite reasonably perceive that the cost of mastering them is too high.

Perceptive analysts and designers have always recognized common functions in their application specifications, but the process of doing so has been largely informal. Many business applications contain a rather large set of common functions that lend themselves to a common software approach.

The decision to build an application around a base of common software modules must be made explicit quite early in the design process so that all further effort can be efficiently directed.

End-user computing is not a new idea, so why do we now treat it as a state-of-the-art development? One reason is that, until now, whoever approached the computer was forced to learn computerese — at great personal sacrifice. If we believe the advertisements for various end-user computing tools, the professional programmer may soon focus solely on core production systems and tool development, leaving to the user the development of most data extraction and analysis systems. Clearly, if the user can directly translate his unspoken information requirements into a working system, he won't have the DP staff to kick around any more.

If only to sell more computers, hardware vendors would welcome any approach to program development that used more computer resources to leverage scarce personnel to develop new applications that used more computing resources. Since they develop many of the packages and tools and generally corner the market on really superb professional programmers, software vendors certainly favor the techniques described here. Corporate users and DP managers are also on board the write-less-code bandwagon.

Time is clearly on the side of the approaches described here, but I would not yet discharge my Cobol programmers nor declare that all user needs can be satisfied by a new data base management system. As in all things, a balanced mix of these techniques with more traditional application development strategies will produce the best results.

MANAGING INFORMATION FOR ALL ITS WORTH.

ISA has 13 information systems working profitably for nearly 2,000 companies worldwide.

These systems provide everything from solid control of accounting data to sophisticated financial modeling and portfolio management.

Our consulting staff leverages talent customers have in-house and assists with requirements studies, system development, even turnkey implementation.

We sell solutions. Our people talk business, not software.

ISA customers vote their confidence every year with the highest percentage of product support renewals in the industry.

So what are you waiting for? Call or write the ISA Information Center, 500 Northridge Road, Atlanta, Georgia 30336. In Georgia, call (404) 587-6800.

CALL ISA TODAY.

1-800-554-1193

© 1984 Information Systems of America, Inc. A United Telecom company.

ISA™

INFORMATION SYSTEMS
OF AMERICA, INC.

Tired of waiting for IMS disk logging?

**Get a taste of
disk logging today!**

- ☐ Please contact me about a 30 DAY FREE TRIAL.
☐ Please contact me with more information on LOGPLUS.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Clip and Mail to:

BMC
SOFTWARE

P.O. BOX 2002/Sugar Land, Texas 77478
(713) 446-0000

CW

A tale of two languages: Mumps and RPG

By Stanley R. Myers
Senior to CMA

How does a childhood disease compare with a report generator? The question is not often asked because Mumps, the programming language, and RPG, one of the original tools for user access to information, are not generally used for comparable applications. RPG is commonly used for accounting and business applications and Mumps for medical and scientific applications.

This is the tale of identical applications written in two very different languages. There are two major productivity issues when choosing system development tools. The first issue is the suitability of the language facilities to the task at hand, and the second is the efficiency of code production as a function of numbers of levels of indirection.

Although RPG was developed in an era when user access meant report writing, one of its major limitations persists and is implicit in high-level query languages. RPG as a compiled language on the IBM System/36 is surrounded by many auxiliary utilities that must be used together to produce an application.

Command language programs

A command language program is used to link together RPG objects so that they can be evoked from a menu. The screen formats are defined via a screen development aid that allows the user to lay out the screen format, the format being a file that is referenced by the RPG compiler. The final component of an executable RPG application is the external file definition, which, just as in the screen format, is referenced by the RPG compiler. Screen and file formats must be compiled themselves prior to the actual RPG compilation. As easily imagined from the components, the compiled programs need not execute in main memory.

Similar to Basic with respect to programmer productivity, Mumps

has a somewhat elegant file access method. When implemented on a minicomputer, Mumps is a stand-alone operating system/interpreter and language. In this environment, many small (2K- to 4K-byte) programs are serviced concurrently in fixed partitions by an approximately 30K-byte operating system. Service may be the execution or entry of a program. There are often no languages or commands available other than the Mumps commands. There are fewer than 36 commands in most cases, so a command can be referenced by its first letter in order to save space in the programs.

Two accounting functions, accounts payable and general ledger, were exactly duplicated in Mumps and in RPG by the same programmer for the same users. Therefore, the languages can be compared specifically with respect to their effectiveness as development tools.

The chart (see SR/53) is labor-intensive on the RPG side of the ledger. If the applications could be broken down into two components — on-line data entry and batch reporting — each language would have a superior attribute. Screen handling, on-line data entry and retrieval are more efficiently dispatched with the Mumps

language. Voucher entry illustrates the on-line ease by the 150 vs. 750 lines of code. Once the files have been created, RPG and the IBM System/36 data base management system do a powerful job of multiple-path accessing for relatively easy reporting. The accounts payable distribution report shows 90 vs. 220 lines. But not reflected in those numbers is the ease with which the file, now created, can be reorganized for various reporting needs.

The differences between interpretive and compiled languages have been discussed in many forums. The delay of compilation was less of a

Myers is the founder of Decision Design Research, Inc., a consulting firm based in Chadds Ford, Pa.

TURN YOUR ACCOUNT RECEIVABLES INTO IMMEDIATE CASH.

Developing CASH-FLOW is important to every business. The process of obtaining the funds is another matter.

THOMAS CAN HELP

By selling one or more invoices to us, you can be paid within 24 hours or less. TAKE ACTION TODAY! There is no need to wait for invoices to be paid any longer.

- NO loan contracts to sign.
- WE assume the credit risk.
- ALL information is kept confidential.

CALL: MR. FARKAS, N.Y.
(212) 678-4300

Out of state use our Toll Free number
1-800-527-2138

Thomas Funding Corp.

Office Memorandum

SPECIAL REPORT

excel, but for different uses

problem than the number of objects that required compiling. In a one-program-for-one-program situation, the delay of waiting for the compile would have been trivial with respect to total development time, but the fact that a function required compilation of several components was responsible for contributing increased development time to the RPG on-line functions.

The benefit of the RPG independent component and compilation was realized in the batch portion of the application. An externally described file can be referenced for report writing. Also, logical views or multiple

path accesses to a physical file can be maintained on-line or in batch mode as requirements dictate.

Mumps files offer multiple-path access to files, but each program must have knowledge of the file structure rather than use an external reference or description of the file. The Mumps programmer is responsible for the maintenance of the access paths, whereas the external file definition used by RPG maintains the paths. The determination of on-line or batch maintenance is made within the external file definition itself.

The two systems each excel in the function they were designed to do.

Mumps runs a lot of terminals on very little hardware and, with additional savvy, an elaborate file structure. Screens are byte-in, byte-out, and data can be placed at will throughout the system. RPG addresses large data bases with ease and handles terminals with a little added programmer patience. The screens are block mode and oriented toward a record, thus a file and multiple files can be accessed by one screen. The choice



here boils down to determining whether the majority of the processing requirements mandate facility of input or of output.

Both languages are able to produce the specified function. The programming effort increases when the language is less suited to the job to be done. Sales analysis is an application where input is trivial, but the output must be managed many ways for the myriad reports for management analysis. A programmer could program this application more quickly in RPG than in Mumps.

In contrast, for order entry, the use of easy screen access is more important than being able to look at the data many ways. If the customer placing an order is to be immediately advised as to whether the product is available, or if the company wants to check the customer's credit prior to committing to ship, the screen handling and multiple-file concurrent access are the critical language features. Therefore, order entry could be programmed more easily in Mumps than in RPG.

The second productivity issue is the availability of the number of levels of indirection. High-level languages usually have only one level of indirection, namely, the use of variables. The design of these languages is such that the user can define a file, assign variable names and then perform operations on those variables. Languages designed in this way usually have system utilities to input and output data, and the user merely defines the names and parameters that apply to the required function.

In contrast, more technical programming languages with multiple levels of indirection allow the programmer to write more symbolic code that accomplishes more functions per line. For example, a programmer might write a single program to handle all of the screen input and output that references a file layout. In a high-level language, this would be provided by the system in a screen definition and data dictionary type of system utility. Obviously, the complexity of programming in the technical environment is greater, but the amount of programming is considerably less. The amount of the difference in the case described here is a 50% increase in the development time.

With each of the systems discussed here, there exists yet a higher level language than the one used. In each case, the application generator translates user parameters into functional equivalents of the programs created at the lower level. The Mumps application generator was not used due to the projected runtime overhead. Adding one more layer on an interpretive language would have greatly slowed production. The RPG generator was not used because of functional limitations.

Choose UCC-2 The Easy Path . . . IBM Did!

CALL US OR CALL IBM

We have always believed that the best way to change from DOS to MVS is with UCC-2 . . . and now we know that IBM agrees. UCC and IBM have recently signed an agreement allowing IBM to market UCC-2 on a non-exclusive basis.

NO PROGRAMS TO CONVERT

With UCC-2, you can run DOS programs under MVS without converting the programs.

SAVE MONTHS OF TIME

That means you can move your entire DOS workload to an MVS environment . . . without the awesome task and expense of converting your existing programs.

MVS FACILITIES RIGHT AWAY

It also means that you can start enjoying the benefits of MVS across-the-board . . . right away. You can be running a standard MVS data center months sooner.

CALL TODAY

Ask us about UCC-2 today. We can get you started on the right path. Purchase or lease terms available. Call 800-827-5012.

UCC

Dallas • London • Paris • Toronto • Frankfurt • Zurich
UCC Corporation, Exchange Park, Dallas, TX 75235

Formerly University Computing Company. UCC is the trademark of UCC Corporation.

**Software International
Understands That Human Resource Management**



That's why Software International Financial and Personnel

Requires a Special Touch.



SOFTWARE
INTERNATIONAL

Software Packages are running in over 5000 installations.

Run With Us

Software keeps Air Force jet engines roaring

WEST PALM BEACH, Fla.
—The fastest, highest flying airplane in the world today is the U.S. Air Force SR-71.

Like the U.S. Navy F-14, the Air Force F-15 and the Air Force F-16, the SR-71 is powered by a special breed of jet engine. These engines, costing as much as \$3,000,000 apiece, must routinely meet performance requirements undreamed of in civilian aviation.

A broad array of computerized systems is used in the design, manufacture and testing of these engines. And at Pratt & Whitney Aircraft, basic to these systems is a series of software products from Software AG of North America, Inc.

Leading-edge efforts

"Data processing plays an integral part in the entire engineering process for our jet engines," reported Tom Galloway, engineering data base administrator. "The engineering aspects of leading-edge technological efforts would be impossible without computer facilities for computer-aided design and manufacture, development and testing."

More than 2,000 engineering terminal users are supported by three IBM 3081 Model K mainframes with 32M bytes of main memory. The Pratt & Whitney facilities here.

In the engine test area, engines are run on special test stands, with raw data such as temperature, pressure, flow and speeds measured as electrical or mechanical signals, converted to digital

counts and floating-point values and then transmitted across a high-speed data link to the waiting mainframes five miles away.

The amount of data generated by this activity can be staggering. "We do almost 50,000 static engine tests a year here in Florida," Galloway said. "Each of those tests has up to 3,000 different engine parameters. And these parameters usually vary from test to test. We also do transient testing, where we take multiple readings of each measured parameter at a rate of 50,000 data samples per second — with tests running for several minutes."

Rational structure

The combination of high volumes of data and the effort required to track it, manage it and make it available to the engineering staff led Pratt & Whitney engineering to look for a data base management system. The choice was Software AG's Adabas, largely because of its relational-like structure and its ability to accommodate on-line changes.

"We're in a fast-moving, volatile development world here," Galloway said. "It's very different from most commercial environments, where you generally know the data fields you'll be working with early in the application development process. Here, it's nothing like that."

"We don't always know in

We don't always know in advance what data we'll be collecting. Sometimes we don't even know until the data is transmitted from the test site. — Tom Galloway, Pratt & Whitney engineering data base administrator

advance what data we'll be collecting. Sometimes we don't even know until the data is transmitted from the test site. We may find out that they're testing an engine configuration today that has never been tested before, and we have to be able to respond to those requirements when we get them."

"That means being able to define data structures easily, without much advance planning and without taking the entire system out of action for everyone else while we're doing it."

In addition to Adabas, Pratt & Whitney is also using Software AG's Natural, Natural/Graphic and Channel-to-Channel Communications systems.

"We hadn't gone out looking for a high-level programming language originally, but we liked what we discovered about Natural," Galloway said.

"We're still handling most of our number crunching in Fortran, but Natural is leading us in new, very positive and productive directions in terms of how we provide DP power."

Sophistication levels

"We support three general levels of DP sophistication here through Adabas and Natural. There are the real nuts-and-bolts types, the seasoned professionals, who could probably do the job with any tools we gave them. There are the users who are willing to do programming, particularly given a high-order language like Natural. And there are the non-DP people, who work best with predefined screens and fill-in-the-blank systems that have been previously set up for their use. Natural and Adabas are allowing us to let each group seek its own level of expertise and get the job done."

Data processing is reaching into more areas than ever before, Galloway noted. "A lot of people in engineering want to do more than just engine test performance analysis. The ability to do on-line query of data on an easy, ad hoc basis is something we could never offer before."

"Natural/Graphic has the same kind of attraction. This package uses high-level Natural statements to interface with IBM's GDQM graphics facility. Once you've located your engines

with Natural, you simply say DRAW THE CHART, DRAW GRAPH and so forth. 'You don't have to know anything about graphics programming — just what it is you want to see and how you want it displayed.'"

"All this is leading spontaneously to an information center environment," Galloway said. "We have people coming in and, with only a minimal amount of training, loading in their data, defining their screens and generating their own reports — after our DP staff has defined the data structures to the data dictionary."

Multiple hosts

With multiple mainframe hosts involved in related activities, Pratt & Whitney is using Software AG's Channel-to-Channel Communications system to provide data sharing among various systems.

"Channel-to-Channel lets users on different hosts access the same physical data base located on one machine at the same time. An Adabas user can be on one mainframe, and the Adabas nucleus actually residing on another — and there can be as many users on all machines working with the data base. With the amount of data and number crunching we're doing, we could easily bog down a single IBM 3081 if everybody had to use it. This way, we are able to distribute the processing and yet have a centralized data base."

"Another advantage of Channel-to-Channel is that we can run multiple operating systems on the same host, as well as on various hosts, and everyone can communicate with the same data base, regardless of the operating environment."

With Natural and Adabas, Galloway's staff can add new applications quickly while continuing to work on the engine test systems. Pratt & Whitney is placing increasing emphasis on reducing engine costs in design, development and manufacturing.

"We're now putting together a system to track all of these cost reductions throughout the cycle, from suggestion to review, approval and implementation, along with the estimated dollar amounts. This system will allow our engineers to track thousands of possible engineering changes applying to a cross-section of engines in our product lines. Another possible application is a testing program for ELI0 rocket engines."

"Overall, we're experienc-

ing an ability to do more things than ever before — make more data available, support more types of users and activities and provide faster data and analysis turnaround," according to Galloway.

"And what's particularly noteworthy is that we've taken products from Software AG that are primarily designed for commercial DP activity and successfully applied them to the vastly different world of scientific and engineering applications."

DEC TO IBM SNA

Now available... full SNA capability for your DEC computer! Comboard/IMA gives your terminals access to IBM interactive applications. Data can be transferred between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/IMA is a proven and reliable, single-board, 256K communications computer that plugs into your DEC Unibus. Formed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/IMA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

Call now for a demo disk
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

COMBOARD
SNA Emulation
Model 1000
Model 2000
Model 3000
Model 4000
Model 5000
Model 6000
Model 7000
Model 8000
Model 9000
Model 10000

SOFTWARE RESULTS CORPORATION
Call Toll-free
1-800-882-0474

In Ohio call collect
1-414-827-3880
2875 Shiloh Lane, Columbus, Ohio 43211
Telex 89-48 SBC DATA CT

©1984 Software Results Corporation
All rights reserved. No part of this publication may be reproduced without permission in writing from Software Results Corporation.

BATCH REPORT RETRIEVAL

CPMS™ THE CICS LINK

Manages batch reports

See how

- Fully menu driven
- Display batch reports on CICS 3270s
- Route reports to any CICS printer
- Automatic & selective report printing
- Standard FCB storage control
- Reduces need for JCL and counters
- VS1, MVS, CICS
- Over 450 users

For more details on CPMS™ call: (206) 377-0336

HW

NEW CICS Abend-AID PRODUCT ANNOUNCEMENT

Abend-AID/CICS is a powerful software tool that transfers the burden of debugging CICS transaction abends from the programmer to the computer.

Abend-AID/CICS analyzes transaction abends, determines the cause and tells the programmer—What Happened, Why it Happened and Where it Happened. It also provides immediately On-Line the necessary supporting data in a concise, easy-to-use format.

Saves Programmer Time

- ☐ Complete, easy to understand diagnostics. Pinpoints the cause of the abend. Presents all the data needed to solve the abend. Immediate access On-Line through CICS, TSO/SPF or CMS. The region does not have to be active to view Abend-AID/CICS output.

Reduces Production Downtime

- ☐ Since Abend-AID/CICS is only invoked at the time of the abend it can be used both in test and production. Minimum overhead allows Abend-AID/CICS to work for all regions. Works instantly for all programs old and new. No recompiling. No programmer action required.

Greater Management Control

- ☐ An Abend Activity report can be viewed at any time to give you an up-to-the-minute picture of region abend

activity. Report provides transaction code, terminal, abend code, program name and date/time information for all abends.

Greater Flexibility

- ☐ Exception tables enable you to choose desired output—or suppress output based on transaction code, terminal, abend code or any combination. Customized diagnostic modules can be created for user exits and specialized abend codes.

For additional Product Information or to arrange for your FREE 30 Day Product Evaluation call today. **800-521-8353** (In Canada or Michigan 313-540-0400) or return the coupon below to Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

I want the computer to work for me. Please Send:
☐ Additional Abend-AID/CICS Product Information
☐ Additional information on Free 30 Day Product Evaluation.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ Operating System _____



Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

COMPUWARE



International Offices: New South Wales, AUSTRALIA Phone (61) 2 816 1177 / Leam, Bedfordshire, ENGLAND Phone (44) 582 28 483 / Paris, FRANCE Phone (33) 1 624 1300 / Milan, ITALY Phone (39) 2 45201 / Wiesbaden, GERMANY Phone (49) 630 58833 / Tokyo, JAPAN Phone (81) 3 479 1800 / Oslo, NORWAY Phone (47) 2 36 3570 /
Düsseldorf, SOUTH AFRICA Phone (27) 11 767 5600 / Hamburg, W. GERMANY Phone (49) 40 23 3251

DP development not child's play at Carter's

GREFFIN, Ga. — Establishing a data processing department to provide information systems for the manufacturing division of a large manufacturing company is no easy undertaking.

The William Carter Co. is not a stranger to data processing; the first computer used by Carter's was acquired in the mid-1960s. Since that first machine, many DP systems that have contributed to the success of the company have been developed and implemented.

Carter's is a large children's apparel manufacturer, in business since 1865, with 6,500 employees and annual sales of \$180 million. Carter's is headquartered in Needham, Mass., and has 16 manufacturing locations in Georgia, Texas, Mississippi and Pennsylvania, as well as 12 sales offices located throughout the country. In 1980, Carter's manufacturing headquarters, located here, 30 miles south of Atlanta, established a DP center to service its manufacturing divisions.

As with the development and implementation of any complex information system, a detailed design of the manufacturing system had to be prepared and approved by top management long before the coding of any application programs could be started.

With the development plan approved, the next task was to evaluate and procure the computer hardware that would service the manufacturing divisions.

Data General Corp. was selected as the computer vendor. Currently, Carter's has a DG M/600 and a DG MV/10000 computer system at the manufacturing headquarters here. Carter's also has eight DG CV/10 computer systems distributed throughout its various manufacturing locations.

The manufacturing computer system operates in a distributed environment, utilizing various methods of communications, which encompass:

- Ten CRT terminals located in the Needham headquarters that are connected to the MV/10000 system here via a dedicated leased line. The 10 terminals utilize a Microm Systems,

Inc. data concentrator that allows the connection of up to 16 terminals on one dedicated leased line servicing each terminal at 9,600 bit/sec.

- Remote Job Entry (RJE) between the MV/10000 system here and the remote CV/10 systems at the various manufacturing locations.

- RJE between the MV/10000 system here and a Honeywell, Inc. DPS 66 mainframe in Needham. This RJE linkup utilizes both a dial-up connection at 4,800 bit/sec and the dedicated leased line at 9,600 bit/sec. By uti-

lizing a switch, the dedicated leased line that services the terminals in Needham during the day is used for RJE communications during off hours.

During the process of evaluating computer hardware, an evaluation of Cobol code generators was also undertaken. After evaluating the packages that were available, Carter's selected System-80 by Phoenix Systems, Inc. of Pittsburgh.

David Bumpus, DP director for manufacturing, was given the task of

bringing the manufacturing systems on-line as fast as possible with accurate results.

"With three experienced people on board, using the Cobol code generator enables us to hire personnel just out of college or two-year technical school and sit them down with System-80. Within two weeks, we can have them writing on-line programs," Bumpus said.

At present, Carter's manufacturing DP department consists of eight systems and programming personnel. "We're still developing a lot of new applications utilizing the Cobol code generator. When we first started using System-80, it generated about 70% of the code we needed. We added or changed the rest of it. This is especially true for the on-line applications. I'd say that from October 1980 up through the present, we have over 600 application programs in the manufacturing divisions, of which about 90% are on-line applications. That is quite an accomplishment in a few short years."

Biggest advantage

He went on to say that "the biggest advantage of using System-80 was the short time in which it took to develop on-line applications and batch report applications." Using System-80 forces standardization of data file structures.

But there were problems encountered in the process. The code generator's capabilities did not totally satisfy all needs. One of the initial problems Carter's faced was that the code generator could not generate an on-line application program that would perform calculations or provide totals on selected information. To overcome these problems, the programs had to be modified to meet Carter's needs.

Initial training, the reference manual and a trial-and-error method of learning were all used to provide an understanding of how a code generator worked and to indoctrinate Carter's programmers to the capabilities of System-80. Problems and bugs were reported to Phoenix Systems, which contributed to an enhanced version being used here.



The Software Catalog

"Just about everyone who is going to be buying software for his computer will want a copy of this dream book to thumb through." *New York Times*, 12/20/83

"My advice is: Before even talking to the salesman, spend some time with *The Software Catalog*." *Forbes*, 7/4/83

"The 800-page volume for microcomputers sits atop my desk and is used frequently."

"... clearly arranged... includes separate indexes for subject, software name, computer systems, and operating systems. It is much easier to use than LIST."

Update "C" to *The Personal Computer Book*, Peter A. McWilliams

The Software Catalog — the definitive source of information on availability, price, applications, and compatibility of software packages and the systems they run on.

1984 editions: Microcomputers \$75.00
Microcomputers \$115.00
NEWS/Science and Engineering \$29.00 March publication

Let us tell you more about *The Software Catalog*. Please call or write:

Elsevier/International Software Database™

52 Vanderbilt Avenue, New York, New York 10017

Call toll free 1-800-223-2115, or in New York State call 1-212-867-9040, ext. 307

ISI 83

For the best micro/mainframe marriage you need a plan.



DYNAPLAN™

is a 1-2-3 for VM/CMS and MVS/TSO

DYNAPLAN formerly Dynacal, makes the user to combine the micro touch with main frame power.

DYNAPLAN provides all the popular features of Lotus 1-2-3™ and VisiCalc™

For a free 30 day trial call (312) 585-4400

ChicagoSoft
730 N. LaSalle Chicago, IL 60610

Dynaplan is a registered trademark of Dynaplan Corporation. 1-2-3 is a registered trademark of the Lotus Corporation. VisiCalc is a registered trademark of VisiCorp.

The challenge isn't to meet the standard.
It's to set it.



**Hogan's Umbrella™
sets new standards
in large-scale
systems development.**

Hogan's Umbrella is a powerful systems development tool. We designed it to make our own development faster and more productive, and to make maintenance simpler and more efficient. Now Umbrella is being used in over 120 leading DP shops. Find out how the Hogan Umbrella can help you set development standards. Call David Allen at 214/386-0020.

Hogan
SYSTEMS

8080 Spectrum Drive, Dallas, Texas 75248

Fourth-generation tool powers bank's assets

LOS ANGELES — When Union Bank's Treasury Department set out four years ago to build an asset and liability management system, it was thinking more of spreads and maturities than of fourth-generation languages and programmer productivity.

The spread — the difference between the interest rates on loans and the rates on deposits — is one of the most important factors in bank profitability, especially with the volatile money market conditions of recent years. Asset and liability management in large part consists of matching maturities of bank loans and other

assets with those of deposits and other liabilities to maintain a stable and profitable spread.

With \$7.7 billion in assets, Union Bank is one of the largest banks in the Southwest. But like many other financial institutions, Union Bank suffered during the late 1970s from asset and liability management that was more an art than a science.

The bank's Treasury Management System (TMS), which makes it possible to compare maturity schedules of groups of assets with groups of liabilities and to monitor interest spreads, has been a key factor in improving Union Bank's profitability. Accord-

ing to William E. Myers, vice-president of finance division systems and the manager responsible for development of the TMS, the key to TMS was Powerhouse, fourth-generation software from Ottawa-based Cognos, Inc. (formerly Quasar Systems Ltd.).

"If we'd had to depend on Cobol," Myers said, "we wouldn't have been able to get results fast enough to meet the bank's needs. Powerhouse allowed us to develop the system by using the bank's treasury department financial experts, who understand the investment area, rather than outside programmers."

Union Bank's treasury department

is responsible for funding the bank and for going to the securities markets to buy and sell as needed. Improved decision support for treasury operations has had a major impact on bank earnings. During the first year that TMS was operating, the treasury department contributed significantly to the bank's bottom line. Since then, net interest margins have stabilized at a high level, and the bank's 1983 net profits were up 25% over the preceding year.

The TMS uses a Hewlett-Packard Co. HP 5000 minicomputer to track the daily activity of several hundred million dollars in federal funds, Eurodollars, certificates of deposit, commercial paper, fixed rate loans and more than 30 other categories of funding sources. Every afternoon, a daily executive summary report is produced, which shows the maturities and interest rates of major elements of the bank's portfolio. An online chart assists the bank's traders and managers in monitoring cash flow of money market assets.

Controls trading operations

The senior vice-president in charge of asset and liability management relies heavily on the daily TMS report in controlling treasury department trading operations and in making tactical decisions about bank funding. The TMS data base also makes possible sophisticated financial modeling that top management utilizes in setting strategic policy.

Detailed reporting from the TMS data base allows management to assess the performance of various operating units of the bank and helps them keep tabs on the bank's capacity to enter financial markets. By using TMS to analyze certificate of deposit activity and performance by edition, for example, the treasury department was able to define new investment opportunities for the bank.

Union Bank's treasury department used applications experts rather than programmers to build systems and integrate existing lower level systems into a fourth-generation environment built with Powerhouse.

First stages

The first stages of Union Bank's TMS project were written in Cobol. Powerhouse was brought in about halfway through the project. Because Powerhouse was designed to work with existing systems, the treasury department was able to incorporate the Cobol programming that had already been done.

Development of the TMS was completed primarily by a treasury department accountant who had no previous programming experience. All enhancements to the system are being written in Powerhouse, and the department plans to replace existing Cobol programs with Powerhouse as new requirements appear.

The TMS changed the way Union Bank runs. "The system pushes the bank's balance sheet into a central computer so that it can be managed daily," Myers said. "It was Powerhouse that gave us the ability to develop, maintain and report from an extract data base containing the most important financial elements over which the bank has control."



THE POWER OF JOHNSON SYSTEMS SOFTWARE

Information gives you the power to make intelligent management decisions. For more than a decade, Johnson Systems has provided management the information to move efficiently and more effectively run their Data Center. Our well-established line of products has helped guide over 3,500 users worldwide through the problems of Data Center management.

The integrated software approach we of-

fer allows you to operate your Data Center as an efficient business. Our Job Accounting Report System (JARS), enables you to monitor and report on resource utilization (JARS/COS gives you reporting capabilities on COS usage. ARX automates production control, eliminating human error and costly rework. Our unique approach can result in compatibility with corporate management and a competitive edge in your marketplace.

EXPERIENCE THE POWER!
CALL JOHNSON SYSTEMS TODAY!

Environments: IBM 370, 303X, 308X, 430X and compatibles.

Call 1-800-368-1010 for more information.

Johnson Systems 8300 Greenboro Drive
McLean, Virginia 22102

Program generator an ally in battling backlog

By Dan Pines
Special to CWS

According to a survey Computerworld conducted last year, application backlogs comprise the single most pressing problem facing DP managers. It seems surprising that more than half of the respondents complained of a continuing backlog, considering the increased power of hardware and the plethora of new software on the market.

One solution that has gained mo-

Pines is president of Bystal Corp., a developer of software productivity tools based in Berkeley, Calif.

mentum is the use of program generators, which allow a programmer to generate source code by selecting items from menus interactively, respond to prompts and paint application layouts directly on the screen.

Usually the generator is used to produce the majority of code. The finished code may include some highly tailored logical procedures, complex data validations and specific screen-handling requirements beyond the capability of any generator.

Program generators are designed to assist programmers, not replace them. As such, they are often confused with application generators,

which are strictly end-user products.

Industry gurus predict that as application generators become more sophisticated, they will render the programmer extinct.

Today's users may generate some of their own applications, but sooner or later, an application will require too much tailoring and sophistication to be produced automatically by an application generator.

Procedural languages such as Cobol—which is structured to format, move and manipulate huge quantities of data—have proven to be the most popular way of implementing software solutions to business problems.

While these languages can provide the flexibility to accommodate most business applications with minimum overhead, they have been criticized as being time-consuming to write, modify and maintain.

The real problem with Cobol, however, is not with the language itself, but with its implementations. While there are a few programmers in every DP department who are highly productive, there are many others who write poorly documented, unstructured code. Because of such low-quality work, DP managers see their programmers spending up to 80% of their day maintaining applications that took only a small amount of time to produce.

Program generators provide one way of helping the bulk of average programmers up their productivity. Program generators shine in producing the more routine, mechanistic sections that make up the bulk of any source code.

Speeding programming

Some examples of how program generators can speed up programming are:

- **Rapid prototyping.** A working program in the rough may be worth a thousand words of design specifications. With a program generator, a programmer can produce a quick approximation of the finished product, sometimes in a matter of hours.

- **Minimal debugging.** The automated process greatly reduces syntax errors and makes logic errors easier to locate and change. For less experienced programmers, this can cut turnaround time substantially.

- **Easier modification of code.** Maintenance and modification typically consume over half of a DP department's resources. A program generator can speed up both of these tasks in the same manner as it produces original code.

- **Consistent, well-organized code.** Considering the speed with which programmers change jobs, it is becoming increasingly important that any programmer be able to understand the structure of any source code, no matter who wrote it. A good program generator establishes a de facto shop standard to which all participants can adhere.

- **Portability across many systems.** The gulf between mainframes, minis and micros is not well bridged. By producing applications in an Ansl standard language, the source code can be ported across many systems and recompiled.

A generator does not replace a programmer; programming is a skill that remains something of an art. It merely automates the repetitious parts. No programmer suffered from a motorized wheel.

Both types of productivity tools—the user-oriented application generator and the DP-oriented program generator—are strengthening the tenuous links between end users and programmers.

Eventually, an integrated approach may be the answer, with a single software solution serving everyone's ends.

Until then, programmers will use program generators to retain the flexibility of a procedural language and boost their productivity.

When just backing up a file has you down, the Westinghouse Disk Utility System can save you.

You don't have to swim through miles of manuals and instructions to back up a file quickly and easily. Let the Westinghouse Disk Utility System help you breathe easier.

The Disk Utility System provides comprehensive capabilities for reliable backup/restore/copy on all IBM 4300, 3030, 370 or other compatible units running in a DOS/VS(E) or DOS compatible environment. And it does it fast.

It's feasible, too. It can restore any file selectively or restore a full volume. It can relocate files, delete expired files or reorganize files. It even offers portability across

device and architecture boundaries: from OKD to RBA and vice versa.

The result: You can manage your complete data files and libraries quickly and easily. And with full data integrity protection and operations security.

If a simple job is pulling you under for the third time, don't let it happen again. Call us about the Westinghouse Disk Utility System, Westinghouse Backup Corporation, Management Systems Software, (412) 825-7000. For information, write us at 777 Penn Center Blvd., Pittsburgh, PA 15235.

You can be sure...
It's Westinghouse



SPECIAL REPORT

Execs' info system gives quick access

SUNNYVALE, Calif. — The use of an integrated relational data base management system combined with touch screen technology is providing executive management at Verbatim Corp. here with instant access to critical business information.

Verbatim is a leading supplier of removable magnetic storage disks. Fueled by the explosive growth of the microcomputer market, Verbatim experienced a 41% increase in revenues and a 53% increase in profits in the past year.

To satisfy the requirement of keeping track of critical business factors on a timely and regular basis, Richard Diamond, corporate director of MIS, began development of an Executive Information System (EIS). According to Diamond, the EIS had to have the following characteristics:

- It could not be well-defined before starting.
- It would be dynamic in use and, therefore, would require a highly flexible design.

- It would need to be modifiable quickly and at a very low cost.

- It would need to be very easy to use and results-oriented. Integrated on-line graphics was a must.

Fast step

The first step was taken in September 1983. Using a methodology developed at MIT and with the help of outside consultants, a series of executive interviews were held to determine Verbatim's critical success factors. These success factors were the key measures that would drive the EIS design.

The EIS had to contain current information on the sales outlook, order backlog and other sometimes subjective data to give senior management a useful tool with which to make decisions, according to Diamond.

Diamond turned to Carl Gallmeyer, manager of executive information systems, whose primary responsibility is to evaluate software tools for Verbatim's Hewlett-Packard Co. HP 3000.

"We looked at a lot of products and realized we needed to prototype the EIS application," Gallmeyer said. "We had to move quickly, get something good and right on-line and not invest too much in getting it done. Of the fourth-generation products evaluated, Relate/3000 from Computer Resources, Inc. (CRI) in Santa Clara, Calif., was the best. I liked the fact that it was one piece of software, and I thought it was well integrated."

Verbatim was one of the first users of Relate's screen-based application develop-

ment facility, Application Builder. Diamond said, "Senior executives are the end users. The screen interface is a key element in our ability to bring the system up quickly and to have a user-friendly environment."

Approximately a dozen senior executives use HP 150

touch-screen computers to access the EIS. The HP 150 serves two functions: It is a high-resolution graphics terminal, and it puts a microcomputer on each executive's desk.

Decisions of the need to get on-line quickly, the system had to provide a method for

developing the application via a prototyping methodology.

"It was far more important to have the capability to get the application up and in front of the user than to try to design the world's most perfect application," Diamond said.

As executives use the EIS, their suggestions are being used to guide the second phase of development. Verbatim's president, Malcolm Northrup, said, "The key is that the EIS is an active system that can be enhanced as we learn more about what we really need."

OXFORD JUST TAUGHT CICS to COBOL

UFO/COBOL™ replaces Command Level COBOL with plain vanilla COBOL.

UFO/COBOL is the perfect answer to your procedural on-line programming needs. For the first time, all your COBOL programmers can now develop CICS applications without learning one word of new code. No longer will the lack of specialized Command Level programmers be a barrier to satisfying the growing demand for more on-line applications. Now your present staff can put their ANSI COBOL programming skills to work cutting your backlog of on-line applications... doing it faster, more efficiently, more automatically than ever before.

Without modifying your on-line environment or operating system, UFO/COBOL takes standard COBOL commands, and automatically translates them using a unique COBOL compiler into the language necessary for CICS program execution. Your ability to utilize the substantial benefits of the on-line

or modify screens without writing one line of code. You design the screen simply by positioning fields where you desire. Then COBOL data descriptions are automatically generated from the screen.

UFO/COBOL makes prototyping easy.

By quickly defining a sequence of screens, you can prototype the final system... testing and modifying each screen before writing code. You can develop applications interactively with end-users, gaining all the efficiencies of their direct involvement.

Developed by Oxford... #1 in CICS application development.

UFO/COBOL is a development of Oxford Software Corporation, the leading independent supplier of on-line application development software. With more than 1500 installations of UFO... the premier, 4th generation non-procedural approach to application development... no one knows more about the CICS application development environment than Oxford.

If you'd like to learn how you can dramatically add to your on-line development capabilities, using your present programming skills, call in the leader. Call Oxford today at (800) 631-1615.

An example of UFO/COBOL commands.

| IN COBOL | IN Command level | IN UFO/COBOL |
|-----------------------|--|-----------------------|
| DISPLAY (SCREEN NAME) | EXEC CICS SEND MAP (XDF-CM) MAPONLY ERASE END-EXEC | DISPLAY (SCREEN NAME) |
| READ (FILE NAME) | EXEC CICS READ DATABE (FILE NAME) INTO (FILE NAME) RECORD (K) (Y) END EXEC | READ (FILE NAME) |

environment increases enormously, while your programmers continue to write in a familiar and natural way.

UFO/COBOL defines CICS 2270 screens on-line.

In addition to extending the capabilities of your programmers, you'll find that UFO/COBOL is a powerful new method to speed-up the CICS application process dramatically. Built into UFO/COBOL is an interactive screen painting facility that lets you design CICS 2270 screens on-line. UFO/PAINT allows you to build

OXFORD SOFTWARE CORPORATION
104 BOULEVARD-HASBROUCK HEIGHTS, NJ 07024 201 286-4505

☐ I'd like to schedule a UFO/COBOL demo. Please call to set a date.

☐ Please send me literature on UFO/COBOL.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone () _____

User requests needn't be a pain in the neck

Instead of the cross, the Albatross can be a relief, even a help.

— Samuel Taylor Coleridge
The Rime of the Ancient Mariner

By James Hitting
Special to CWI

Any analyst who has responsibility for a system with a large backlog can easily feel like Coleridge's Ancient Mariner. In addition to supporting the daily operations of the system, he must carry an albatross of unfinished work requests. Simply organizing the outstanding work can be a monumental task, one that has caused many an analyst to pack his resume and leave.

Application backlogs are a perplexing and growing problem among DPers. Often the analyst faces a large backlog of work, requested months or years ago, that has been passed down to him through several predecessors.

He sees no possibility of ever completing the work, and yet he cannot refuse the assignment. He must either accept the system (and ignore the backlog as long as he can) or leave.

Both alternatives are bad. In leaving, the analyst gives up a job with which he may have been very happy, and he runs the risk of a similar assignment wherever he goes.

In staying and ignoring the backlog, he actually contributes to the problem instead of correcting it. What the analyst needs is another alternative.

The first step toward successfully eliminating an existing backlog is to organize it. Canadian author and educator James Bradley defines management as "the creation and maintenance of useful and productive order." It is in order you are after, order that may vary according to the application, but order nevertheless.

Whether you organize by size and complexity or by program function, the key is to find the most logical groupings of the individual requests. By combining them you can often find one solution that will satisfy two or more needs and eliminate any duplication of effort.

Reporting is one example. Consolidating information requested on several reports can save significant amounts of programming time, as well as processing time and paper. Another advantage of organizing the backlog into groups of requests is that it allows you to estimate time and assign priorities to the larger logical units.

Estimating the time and resources needed to complete each group is next. Time estimates are normally made in terms of either elapsed time or actual man-hours.

Using man-hours gives a more precise view of the effort involved and eliminates many vague factors, including emergency support, scheduling delays and computer availability. Be as accurate as possible in your estimates, and avoid the temptation to build in safety margins.

When you have completed

the estimates, contact the user requesting the work. Discussing the request offers several benefits.

Benefits

First, you can confirm that the request is still valid and, if not, note any modifications and revise your estimates.

Second, you can let the user know the time and cost involved. An internal chargeback structure is the best means available for communicating the magnitude of systems work.

Revising each request and justifying its cost will make assigning priorities easier. Whether you prioritize according to category (for example, problem solution or maintenance) or by the complexity of the work involved, assigning a correct priority is important.

Priorities are clearer when a limited scale is used: for example, 1 to 4, where 1 is work requiring immediate attention, and 4 is work that can be completed as time permits.

With assigned priorities, you can use and your time estimates to design a schedule.

Keep in mind the timing of peak production periods and allocate more support time for them. Scheduling review points provides the opportunity to monitor your progress and to revise the remainder of the schedule if necessary. Short-term schedules (one to three months) should have at least three review points; medium- and long-term schedules need more.

Management support

The next step, and the most important one, is to gain management support. You will probably be requesting significant resources over an extended period of time. Providing carefully researched estimates and demonstrating the ability to organize and manage the project will be factors in your favor.

The key point in this step is to present the backlog as a single entity. You are seeking approval for one project that, when complete, will eliminate all outstanding work on the system and allow future requests to be handled more quickly. In addition, more time will be available to support the daily operation of the system and to research possible improvements. As a means to this end, the time and cost of the project are

critical. It is a systems analyst and a project leader with Vulcan Materials Co., a Birmingham, Ala.-based chemical and materials company.

will justified.

All that remains is to begin eliminating each request (or group of requests) from the backlog. When you complete an item, notify the person who requested the work. Obtaining his approval assures you that your solution actually meets his needs and keeps him aware of your progress.

When problems arise from the continued daily operation of the system, assign them a priority and work

them into the schedule if possible. If they require immediate attention, revise the schedule and notify management of the delay.

One final point: Maintaining a positive mental attitude toward the project will enhance the quality of your work and speed its completion. Consistent, systematic effort will soon eliminate your "albatross."

And from my neck as free the Albatross fell off, and sank like lead into the sea.

DO YOU WANT TO LIVE IN A VACUUM? IF NOT, then BREAK OUT WITH TIPS!!

- Who: ALL IBM USERS
- What: TIPS, Technical Information Processing Service
- Where: ON LINE, from your desk
- When: AVAILABLE IMMEDIATELY
- Why: To provide YOU with...
- Systems Problem Solving
 - Systems Information
 - Classified Advertising
 - General Information
 - and much more

Let TIPS improve YOUR productivity as a computer professional.

Call or write today for further information:

MNEMOSYNE Systems, Inc.
P.O. Box 440678
Houston, TX 77244-0678
(713) 561-0688

ESP makes the best programmers perform even better.

Bellesoft introduces professional Pascal, C, and Ada programmers to Computer Aided Programming. ESP, the Entry System for Programs, makes programming staffs more effective through Program Editing • Language Oriented Abbreviations • On-Line Formatting • On-Line Syntax Checking • On-Line Help.

Call your computer manufacturer or contact Bellesoft, the company that specializes in programming tools for serious programmers. Bellesoft, Inc., 2820 Northrup Way, Bellevue, WA 98004. 206/828-7282.

BELLESOFT
CAROL BOON!

POWER
PROGRAMMING MAINTENANCE
AND DEVELOPMENT TOOLS

{SET:SCIL}

The Source Code Interactive Librarian for microcomputers.

- SCIL keeps a historical record of all changes made to the library.
- SCIL maintains any source code regardless of language, including user documentation and test material.
- SCIL allows software engineers to work with source code as they do now, using any ASCII and editor.
- SCIL saves disk space by moving only the changes made to the program.
- SCIL provides a labeling capability for ease of maintaining multiple versions and multiple releases.
- SCIL offers unlimited description in the program library directory.
- High visibility display with varied intensity for ease of viewing instructions and definitions.
- SCIL is available on CP/M, MP/MII, MS-DOS, PC-DOS and TurboDOS.

{SET}

Get {SET} for Success
{SET:SCIL} is a product of Source Engineering Tools, Inc.

4441 Arroyo Drive, San Diego, CA 92116

Copyright 1984 Source Engineering Tools, Inc. All rights reserved. No part of this publication may be reproduced without permission in writing from Source Engineering Tools, Inc.

**Now that we're published monthly,
you have twice the opportunity to
reach the communications market...**

**and starting this July
you'll get an additional 20,000 readers
at no extra cost ***



July

After more than six months of deregulation and the divestiture of AT&T, we'll explore where the communications world is, and where it's going.

Closes June 1



August

We'll look at full motion video, freeze frame, electronic blackboards, and computer conferencing. Plus we'll examine the cost-effectiveness of these technologies, and provide information on private and public facilities.

Closes June 29



September

We'll study how business communication carriers and users can put voice, data, and other traffic on the thousands of miles of existing CATV cables. CATV loops are a viable alternative to those offered by the Bell Operating Companies.

Closes August 3

Call the Sales Office nearest you to reserve space for your ad, or to get more information. Or fill out the coupon below and return it to: Christopher F. Lee, Associate Publisher, *Computerworld On Communications*, 375 Cochituate Road, Box 880, Framingham, MA 01701. Do it today.

* Call your Computerworld Sales Representative for details.

To: Christopher F. Lee, Associate Publisher
Computerworld On Communications
375 Cochituate Road, Box 880, Framingham MA 01701

Please send me advertising information on:

- ☐ the AT&T Update Issue
☐ the Teleconferencing Issue
☐ the CATV Issue

☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computerworld
On Communications

Sales Offices

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701, (617) 679-0700
CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018, (312) 827-4433
NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus NJ 07652, (201) 957-1350
ATLANTA: 1853 Feeler Road, Suite D, Atlanta GA 30336, (404) 394-0758
SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco CA 94133, (415) 421-7330
LOS ANGELES: 18006 Sky Park Circle, Suite 260, Irvine CA 92714, (714) 261-1230

Alleviating common concerns of application

By Bernard H. Boor
Special to CWS

One of the most imaginative and successful techniques for improving the productivity of application development is application prototyping. Application prototyping is a strategy for performing requirements definition by building a working model of the ultimate system quickly and in context.

This contrasts with traditional specification techniques such as structured analysis, which attempts to specify in detail all needs prior to any contextual design, implementation or operational experience. The difference is not academic — it is the difference between experience and conjecture.

Despite the intuitive appeal of prototyping as a low-risk way to acquire and validate user-acceptable requirements, a great deal of controversy remains. It is not uncommon to read articles in which various industry experts warn of the dangers of prototyping. If one listened to the critics, one might believe that a strategy of shoring an example, receiving feedback and refining the example based on the feedback was imprudent. Yet it is the most common strategy used in numerous disciplines to reduce risk and to confirm ideas before making a substantive investment.

Prototyping is not a perfect approach, nor is it always appropriate. Nevertheless, when properly managed and used, it offers the best strategy for acquiring ultimately acceptable requirements at minimum cost.

Concerns — Prototyping glosses over the real business problems.

Argument — Prototyping jumps much too quickly to building a basic solution. It is likely that only superficial and obvious needs will be addressed. Most of the complicated problems will be glossed over. Only a detailed and thorough analysis of the business problem prior to any physical solution can assure that all the problems will be addressed. Prototyping will result in fast but expensive false starts.

Response — The real problem is not whether you may initially miss some needs, but how to discover strategically all the ultimate needs while minimizing project risks. Descriptive and graphical specification tools are fine, but are extremely limited in portraying the actual dynamics of a potential application. Prototyping provides a means first to approximate the real needs, and then through successive refinements, pinpoint them exactly. Even if some needs are glossed over in the early presentations, the process is self-correcting. The contextual testing of the prototype will reveal any functional deficiencies. False starts should be discovered quickly and cost-efficiently.

Concerns — The user will want the prototype as the actual system.

Argument — After a number of iteration cycles, the prototype will appear to the users as a finished system. If they insist on implementing it,

the consequence will be an expensive product. Prototyping will introduce a whole new set of political problems into the life cycle. Users will be dissatisfied and disgruntled if they still have to wait a considerable amount of time to get the system.

Response — A prototype is exactly what its name implies — a model. There is no magic. Prototyping provides an illusion. It gives the impression of a finished system, but it is missing many of the attributes of a production application. It is imperative for the prototypers during candidate selection to clarify the limitations of a prototype to the users

before starting the project. Nobody insists that descriptive and graphical definition documents be put directly into production.

Similarly, a prototype must first and foremost be viewed as a definition document. Cheating the process will not work. Reality will detect every shortcut taken in attempting to implement the model directly.

Although not directly implementable, the prototype can still help the user during the interim period. If appropriate, it can expedite the design of the actual system by serving as the basis. The prototype can also serve as a training system for the users.

The political problems of dealing with a user who insists on implementing the prototype system is really rather a pleasant change. Most DP managers have to deal with users screaming about how dissatisfied they are with their new system rather than demanding implementation because they are satisfied.

Concerns — Prototyping is a departure from established software engineering practices.

Argument — The body of knowledge developed within the profession over the last few years has focused on rigorous approaches as the best response to development problems.

Computer
training
our way,
your way,
or buy
the book.

prototyping — the experience difference

Many software engineering principles and techniques are implemented within the organization. Endorsement of a prototyping approach will jeopardize the attempt to make software development an engineering process.

Response — Quite the opposite is true. The building of models is the central step of most engineering life cycles.

Most engineering disciplines gave us long time ago attempting to do it right the first time without building some laboratory throwaways. Introducing prototyping into the development life cycle will for the first time

migrate the wisdom of the need for the engineering prototype to software development.

Concern — Prototyping pre-judges a physical solution and will constrain the developers. Prototyping mixes up the "what" problem (logical problem) with the "how" problem (physical solution).

Argument — Prototyping jumps to physical solutions without a careful, logical model of the problem. Logical modeling provides a mechanism for testing various possible solutions before committing to a solution. Keeping requirements definition at a logical level maintains maximum

implementation flexibility.

Response — For whose benefit? The idea that anyone other than the logical model creator is thrilled with logical designs is a myth. Users relate best and most naturally to physical examples. When you take a television, you look at the picture on the screen, not at the wiring schematic.

The physical model can be dissected at the end of the prototype to design exactly many of the system components that logical modeling normally develops.

For example, the necessary logical views of the data base can be predicted exactly by analyzing each screen.

The secondary keys that are required can be predicted exactly by analyzing all screens. Logical planning can be replaced by physical confirmation.

The users' view of the application is still an external view. There is nothing to prevent the developers from revising data base structures, using a distributed data processing solution or selecting different access strategies. When physical realities require compromises, it will be clear what the before and after are.

Concern — The iteration process could go on indefinitely. How do you prevent iteration from thrashing?

Argument — Prototyping is a license to change one's mind. Looping could occur indefinitely between demonstration and revision. The process could become extremely drawn out.

After weeks of demonstrations, you might not be closer to an acceptable model than when you started.

Response — Exactly. One of the primary benefits of prototyping is that it serves as a high-visibility safety valve. A project that is going nowhere in prototyping is a project that requires close management attention. If agreement and consensus cannot be reached now, it is better to scrap the project than to pour huge sums of money into an undefinable problem.

Concern — Prototyping conflicts with data resource administration and the creation of shared data bases.

Argument — Data needs to be treated as an independent resource. The defining, cataloging, structuring and securing of data should be done independently of the functional applications that use it. The result of such an approach will be the creation of a shared data base resource where multiple applications access the same data.

Prototyping, since it concentrates only on a specific application, will tend to take a tunnel view of the world and conflict with the greater issue of proper data and data base administration.

Response — There is only a possible conflict if a complete development life cycle is not completed and the prototype is rushed into production as an isolated application. During analysis, the current base of data and data bases in which the application must be integrated should certainly be considered. If many of the data elements, records and relationships are already defined, most of the work is already done.

When viewed from a more considered perspective, it appears that the laments of the Cassandra of doom and gloom are without merit. The question facing the DP manager is really quite simple. Why settle for a passive written statement of a user's requirements when you can experience an animated and dynamic model? Why settle? It was different when there was no choice. However, today both the technology and the methodology exist to automate the requirements definition. It is simple common sense that meaningful communication and participation will flourish in an interactive and experimental medium.

The only thing as complicated as deciding on a microcomputer is figuring out how to use it. But that's getting easier and easier all the time. Thanks to NTS.

National Training Systems has been making executives, managers and professionals more productive since 1974. We work with some of the largest international corporations. At our place or theirs. Here's how:

Our way:

NTS offers one- and two-day workshops that introduce the microcomputer, teach an integrated software package that supports the user's goals, and provide actual hands-on training.

In our one-day workshop, you'll learn to choose hardware and software appropriate for your needs. In the two-day workshop, you'll use integrated software, such as Lotus 1-2-3™ and its successors. We'll also teach you how to use electronic spreadsheets, graphics, data communications and database functions to solve business problems.

One-Day Workshop Micro Ease™

- What is a personal computer?
- How a personal computer can help you.
- How to operate a personal computer.
- How to use a personal computer for word processing, electronic spreadsheets, graphics and database functions.

Two-Day Workshop Executive Personal Computing Workshop

- How a personal computer and application software can help you.
- Intensive "hands-on" training that allows users to immediately apply what they've learned.
- Emphasis on learning a wide range of decision support functions.
- Fun, interesting business "game" to utilize and apply computer skills.

Your way:

Since 1974 we've developed customized training programs for companies such as United Technologies Corporation, IBM, Hewlett-Packard, Xerox and Burroughs.

We train at your place of business. Using our instructors or yours. We focus on the hardware and software that best suit your specific needs.

You'll overcome your fear of computers. You'll dramatically increase productivity. And if you're not careful, you might even enjoy it.

Or buy the book:

"Putting 1-2-3 To Work" is a hands-on self-study course that teaches the popular Lotus 1-2-3 software at your own pace and your own place.

Using Lotus, you'll learn to create "what-if" models, graphics, databases and spreadsheets in an easy-to-use, time-efficient manner.



You're getting a handbook, practice data diskette, eight application templates, and performance aids. All designed from ten years of NTS training experience.

Send us the coupon, or call the number below, and we'll give you more information. About our own workshops, customized training, or the self-study course. The three smartest computer programs you can buy.

Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

Micro Ease is a trademark of NTS.

Tell me more:

- ☐ Please call me with more information for the following workshops or customized training:
 - ☐ Micro Ease™ One-Day Workshop
 - ☐ Executive Personal Computing Workshop
 - ☐ Customized Training
- ☐ Please send me _____ copies of the "Putting 1-2-3 To Work" self-study course @ \$95 each + \$3 each for shipping and handling. (California residents add 6.75% sales tax.)
- ☐ My check or money order for \$_____ is enclosed.
- ☐ Please charge my credit card.

VISA/MC # _____

Exp. Date _____

Signature _____

Name _____

Title _____

Company _____

Phone (____) _____

Address _____

City _____

State _____

Zip _____

For information, call collect: (213) 394-7685.

(For our New York office, call collect: (212) 869-1730.)

COM

NTS NATIONAL TRAINING SYSTEMS, INC.

Los Angeles New York London
333 Broadway Santa Monica, CA 90401 • 300 Fifth Avenue, Suite 1800, New York, NY 10010

MCBA is looking for some professional bill collectors.

More specifically, we're looking for some dealers who like money. Lots of it. Because when you carry our powerful, field-proven software, that's exactly what you can expect.

Why? It's quite simple, really. The quality of MCBA's library of 17 modular manufacturing, distribution, and accounting packages is attested to by over 15,000 users world wide. In fact, it's really the only serious software of its kind available for mini and micro environments. Thanks to its modularity and flexibility, not to mention its comprehensive documentation. All of which has helped us develop and maintain successful relationships with dealers like you for over 10 years now.



MCBA

This means you can establish a relationship with us and have at your disposal a comprehensive library of software packages. All of which can be mixed or matched to suit the unique needs of your customers.

And as your customers grow, they'll come back to you for more business. Because you can expand their systems with totally integrated packages that work with each other like the movement in a Swiss watch. So no matter what size your customers are now, or what size they are tomorrow, your business keeps growing. And the bills (the green kind) keep pouring in. It might even get embarrassing.

So if you're a dealer who's in it for the money, call MCBA now at (818) 957-2900. You may not end up being famous. But you could end up rich.

Software that grows on you. And with you.

2441 Honolulu Avenue, Montrose, California 91020 For HP, Wang, DEC, and TI minis; and UNIX, RM/COS, and PC-DOS based minis, MCBA® is a registered trademark of MCBA, Inc.

COMMUNICATIONS



WISE TAP
Tony Bolton and
Dr. Hank Schulz

Factory needs demand local net

Factory automation has been hindered by the proliferation of non-compatible communications hardware and software within the industrial manufacturing environment. Clearly, the solution to this problem is the establishment of appropriate communications standards that are backed by vendors with cost-effective and compatible data communications products.

At the heart of industrial data communications stands the local-area network. Unfortunately, efforts to standardize local networks have been hampered by the existence of nonstandard network products, advances in technology and an ever-expanding scope of applications.

However, in September 1983, the 802 Committee of the Institute of Electrical and Electronics Engineers (IEEE) approved its 802.4 standard for token-passing broadband and single-channel (baseband) local-area networks. In a related move, the IEEE 802 Committee and the International Electrotechnical Commission's Privacy Committee agreed on a common approach for industrial local-area networks, known in the process control industry as process data highways.

This standard, called Proway C, is compatible with the IEEE 802.4 standard. Announcing this standard in November 1983, the groups said "The agreement of a common approach is significant in that it permits a standard local-area network media access technology."

See IEEE page 84

Bolton is director of product marketing at Concord Data Systems, Inc. Dr. Schulz is manager of industrial communications systems with General Electric Co.'s automation systems department.

AT&T aims package at BOCs Gives Centrex users management, OA capabilities

NEW YORK — AT&T Technologies recently announced the Advanced Communications Package, a software package being made available to the devoted Bell operating companies that will enable them to offer Centrex customers communication management and office automation capabilities.

At the heart of the new offering is the recently announced AT&T 3B family of minicomputers. With one of the two announced products, the software is loaded into the central office 3B switching computers used to provide Centrex. The second package is meant to run on a 3B installed at the users' site.

The Communications Manager is used by telephone companies at the central of-

fice and enables them to offer users a variety of reports on system usage so they can better manage and control the use of their system.

Other service features of the Communications Manager enable customers to make changes in telephone numbers or service from their own premises. A customer message center feature provides Centrex customers with a centralized message system, which provides information such as busy/idle status and enables electronic message distribution, the company reported. A new Centrex Electronic Key function allows a user to activate all Centrex features with a single button rather than a dialing code, the vendor said.

See AT&T page 84

Prime announces network-related upgrades, plans

By John Ditz
CW Staff

NATICK, Mass. — Prime Computer, Inc. fleshed out its communications offerings here last week with enhancements for its major network offering, extended capabilities for its local office network and an announcement of its intent to develop an Ethernet-type local-area network.

Revision 13.2 of Prismnet, the company's distributed networking facility, is said to provide for increased network performance, connectivity and management facilities. The software enhancements, which, according to product manager Mitchell Brown, are free to current Prismnet users, offer:

■ The ability for one node to converse transparently through what Prime called intermediate gateway nodes with remote network systems.

■ The capability for each network node to support up to three synchronous lines, one of which can operate at speeds up to

See PRIME page 83

MCI cuts over its first fiber-optic, long-distance link

PHILADELPHIA — MCI Telecommunications Corp. recently announced that it has cut over its first long-distance fiber-optic system, a 340-mile link between New York and Washington, D.C.

The optical fiber system more than doubles the long-distance telecommunications capacity between the two East Coast cities, reported Thomas L. Lanning, MCI senior vice-president.

The system employs single-mode, as opposed to multimode, optical fibers capable of transmitting voice, data or video information at up to 405M bit/sec. Single-mode is the most advanced optical fiber technology currently available.

According to Lanning, the system initially adds 15,000 circuits to the 10,000 terrestrial microwave voice circuits MCI now operates between New York and Washington. The fiber-optic link has a potential capacity of 300,000 circuits.

MCI is also planning to build fiber-optic cable systems along more than 4,000 miles

See MCI page 83

INDEX

Voice/Data Communications/82
Multiplexers/Modems/83
Network Services/88

300 BAUD
103A COMPATIBLE



\$147

☐ MODEL 305E2-12

☐ Acoustic Couplers ☐ Modems ☐ Line Drivers ☐ Accessories
☐ Statistical Multiplexers ☐ Protocol Converters

Please attach forms of interest and return to us for additional information.

ComData
7907 N. Hague
Morton Grove, IL 60053
New York Los Angeles
212/694-7700 212/694-7700

We can get you there, from here.

MODEMS
WITH ALL THE FEATURES YOU NEED

FEATURES OF OUR
NEWAL E DATA HDL
AND D LARS LINE
M E N D A T A
R E P R I T I N E
A H A M A L O R I G I N E A N E
S I T I N A U R I G I N A T I N

1200 BAUD
212 A COMPATIBLE



\$377

☐ MODEL 212E2-32

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

COMMUNICATIONS

Datatel unit has automatic dial recovery

Datatel, Inc. recently announced the DCP 1040 automatic dial recovery unit, a device that monitors leased-line activity and automatically switches over to dial-up lines when faults are detected.

Used in pairs, one at each end of the telephone link, the units continuously monitor the Carrier Detect or Signal Quality Monitor signals from modems.

When a fault is detected, the DCP 1040 first tests the modems at both ends of the leased line, the vendor said.

If the modems are okay and the fault is isolated as line-related, the devices place two calls over the

switched-telephone network, test those dial-up circuits and then switch both modems from the failing leased line to the dial-up lines, according to the vendor.

After the switch-over, the devices continue to monitor the leased line and automatically switch back to that facility when the trouble has been corrected, according to the vendor.

The switching routine may be initiated on command via a standard Electronics Industry Association control signal or manually using a push-button on the unit, the company reported.

The units output records of their

activity, including information on modem failures, successful switch-overs, unsuccessful attempts at establishing back-up lines (reported after three attempts), problem-cleared reports and other system parameters and events, according to a company spokesman.

Audible and visual alarm deterrents are also reportedly provided.

The recovery units may be used with synchronous or asynchronous modems at speeds to 19,200 bit/sec, the vendor said.

They are priced at \$1,400.

Datatel is located at Cherry Hill Industrial Center, Pla Oak and Springfield Roads, Cherry Hill, N.J. 08003.



Some data security methods work better than others.

TOP SECRET

the state-of-the-art resource protection package for MVS works best of all.

TOP SECRET is data security at its best. Offering quick installation, phased implementation and comprehensive resource protection, TOP SECRET outdistances all other data security methods for total resource protection.

TOP SECRET immediately secures your most critical resources without impacting normal processing. Implement security with no delay and with absolutely no modifications to your operating systems.

TOP SECRET is the only total resource protection package that offers comprehensive CICS security, including file and program control and protection down to the field level.

By using the Standard MVS Security Interface, TOP SECRET becomes an integral part of your operating system. Complete compatibility with all IBM and vendor products that use Standard Security is automatic and guaranteed, now and in the future.

TOP SECRET security comes with the same top-notch technical support that guarantees the quality and reliability of all CGA software products.

Protect your valuable data resources today. Join the MVS sites across the country that have considered every data security method and made the sure TOP SECRET choice.

Call for additional product information and your free trial.

800-237-2057

cga

Software Products Group, Inc.

800-237-2057

CGA Software Products Group
600 Holmdel Road
Holmdel, NJ 07733

VOICE/DATA COMMUNICATIONS

NETWORK SWITCHING SYSTEMS, INC.

Network Switching Systems, Inc. has announced a digital switch that it claims will enable users to combine voice, data and image transmission on terrestrial, satellite, radio, microwave or fiber-optic communications facilities.

The basic NSS switch has an aggregate throughput of 16M bit/sec full duplex and is expandable to a system with an aggregate throughput of 64M bit/sec, the vendor said.

The switch handles channel transmission speeds of 50 bit/sec to 1.544M bit/sec. Other features include network management tools, redundancy, protocol support and accounting.

Prices range from \$50,000 to \$200,000, depending upon configuration. Units will be available early in 1985.

Network Switching Systems, Three Dundee Park, Andover, Mass. 01810.

MULTIPLEXERS/MODEMS

PARADYNE CORP.

DCX Bluegate and Xgate

Paradyne Corp. has announced DCX Bluegate and Xgate enhancements for its DCX multiplexer-product line.

The options reportedly allow users to integrate multiple protocols in a common network. Bluegate provides asynchronous-to-5670 bps synchronous protocol conversion. Integrally to DCX, Each Bluegate card fits into a card slot of a DCX 840/850 chassis and supports up to 32 terminals, the vendor said.

Xgate reportedly provides the packet assembly/disassembly functions required for a workstation to access a public or private packet-switch network. This conforms to X.3, X.25 and X.29 CCITT recommendations. Each Xgate fits into a card slot of a DCX 840/850 chassis and supports up to 64 terminals, a company spokesman said.

Each option is priced at \$8,000. Paradyne, P.O. Box 1347, 8550 Urmerton Road, Largo, Fla. 33540.

REIF COMMUNICATIONS, INC.

Model 2300

Reif Communications, Inc. has announced the Model 3300 time-division multiplexer.

The product combines seven data channels into a single 56K-byte or 64K-byte trunk and can operate at speeds up to 256K bytes over higher capacity mediums such as microwave. It is available in a rack-mount version that is expandable, enabling up to 35 9,600 bit/sec channels to be accommodated with a 256K-byte link, a company spokesman said.

The 56K bit/sec desktop unit is priced at \$1,995 and includes seven channels when used without flow control and six channels with flow control.

Reif Communications, P.O. Box 3051, Weyland Sq., Providence, R.I. 02905.

See MODERN page 83



Just drop it from a second-floor window onto any would-be intruder?

MODEM

from page 52

MIKOM SYSTEMS, INC.

Dialnet 3000 Model 3004

Mikom Systems, Inc. has introduced the Dialnet 3000 Model 3004, a 3400 bit/sec full-duplex modem for use over the dial-telephone network.

The CCITT V.22 bis-compatible modem (CCITT's revised standard for modems of this type) can reportedly communicate at 2,400 bit/sec with other V.22 bis modems or, alternatively, at 1,200 bit/sec with Bell Laboratories' 213-type units, a com-

pany spokesman said.

Some additional features of the modem include local testing loopback; a built-in test-pattern generator; and digital loopback diagnostics. The standard desktop unit is priced at \$785.

After Systems, 50151 Northridge St., Chatsworth, Calif. 91311.

NETWORK SERVICES

COMMUNICATIONS SATELLITE CORP. SOURCE TELECOMPUTING CORP.

Manitowish

Maritime, a joint service provided by Communications

Satellite Corp. (Comsat) and Source Telecomputing Corp. (STC), will enable passengers aboard ships at sea to receive international news.

The Maritimes news digest includes daily dispatches of weather, sports, business and general news. Information is compiled by STC's electronic newswire throughout the day and evening and is transmitted to a Comsat earth station.

Source Telecomputing, 1616 Anderson Road, McLean, Va. 22102.

HARRIS CORP. Harrisview

The telecommunications networks division of Harris Corp. has introduced Harrisview, a nationwide pro-

gram of operation and maintenance support designed for telecommunications networks.

According to the company, the service supports microwave systems, satellite earth stations, mobile radio, fiber optics, video and switching systems with a staff of Federal Communications Commission-licensed field engineers that are on call 24 hours a day, year round.

Some of the service's features include: assured service dispatch time of two hours, end-to-end service and support and centralized dispatching, according to the vendor.

Harris, Telecommunications Networks Division, P.O. Box 1040, Melbourne, Fla. 32901.

ANNOUNCING

FLASH!

- * ENHANCES OUTPUT RETRIEVAL USING SPY REPORT
- * MENU SELECTION TO VIEW, DELETE, AND RECURSE JOBS ON JES SPOOL
- * USES SPYREPORT BROWSE DIRECTLY AGAINST JOBS IN JES SPOOL
- * 10 - 90 TIMES FASTER RETRIEVAL THAN SPY 3.5
- * WORKS WITH HELD OR NON - HELD DATASETS
- * ALLOWS DISPLAY OF SYSDLOG
- * EMI MVIS OR MVISA WITH JES OR JES3
- * FULLY SUPPORTED

TONE

Software Corp.

12/31 SPECIAL PRICES IN EFFECT

FREE 30 DAY TRIAL

JES 2 FPL \$2500.

12 MONTH LEASE \$36/MO

JES 3 FPL \$6500.

12 MONTH LEASE \$198/MO

1705 S. Bascom Ave. (774) 941-4941

San Jose, CA 95128 (415) 941-4941

Decision Makers:



Management and Project Planning System

MAPPS is a generic management planning and decision modeling tool. Its interactive, conversational structure lets non-computer oriented managers easily interface project TIME, COST, and RESOURCES. MAPPS lets you explore alternatives, then provide the MAPPS view for executives and the MICRO plan to schedule control on the job. All project data can be represented in customized report or graphic formats.

From micro to supermini computer and UNIVAC, the solution is MAPPS.

With MAPPS, MMSI offers:

- 10 years experience worldwide
- Software application and maintenance support
- Extensive educational and training programs
- Professional consulting services



Mitchell Management Systems Inc.

PROJECTS & CONSULTING, INC.
10000 Old County Road, Suite 200, San Diego, California 92126
Telephone (619) 594-0000 Telex 710207 MMSI

MCI

from page 51

of right-of-way acquired from Amtrak, CRR Corp. and other railroads. "When completed, sometime around 1987, the optical fiber network will become MCI's primary transmission medium replacing the present microwave-based network," a company spokesman said.

By year's end, MCI will have installed almost 1,000 miles of single-mode optical fiber cable. Short links have already gone into operation in or near Chicago, Los Angeles, New York and San Francisco. Long-haul links slated for completion this year include: Riviera Beach to Miami and Orlando to Tampa, all in Fla.; Mobile, Ala. to New Orleans; Chicago to Cleveland and Chicago to Milwaukee, MCI said.

PRIME

from page 51

56K bit/sec.

It is a new capability that enables the Intelligent Communication Subsystem 1 (ICS1) communications controller to support wide-area Primnet links (such as through an X.25-based packet-switched network).

■ The increased number—from 32 to 63—of remote log-in users supported.

■ A global network configuring capability with editing that is said to enable users to configure an entire network instead of each individual system.

■ The ability to control and modify an existing Primnet network without affecting the Primnet operating system.

The company also said that it has conformed to the most recent (1980) X.25 standards of the CCITT while retaining support of the 1976 standard. It announced that its X.25 network products have already been recertified by many of the X.25 packet-switched network carriers.

See PRIME page 54

HP3000 & DEC VAX

- C PAYROLL
- C PERSONNEL
- C ADVANCED GEN
- C ACCOUNTS PAYABLE
- C ACCOUNTS RECEIVABLE
- C FIXED ASSETS

SUPPORT MAIN FRANKLIN AND

The Solution

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Biscy line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271-4.5 line—up to 19.2K baud
- Compatible with any 3270 Biscy emulator including microcomputers
- Connects between remote and mainframe
- Installs in minutes

\$639.

MS
MicroView, Inc.
 205 Livingston Avenue
 New Brunswick, NJ 08901
 (201) 828-4488

COMMUNICATIONS

PRIME from page 83

including Tymnet, Telnnet and Uninet.

Some of the Prismnet enhancements were realized by extending the capabilities and capacities of Ringnet, the company's token ring network designed to interconnect Prime Series 50 host computers locally.

New settings

Ringnet enhancements that were bundled into the Prismnet upgrade include new utilities that are said to provide a dynamic display of network activity for each node, as well as an increase, from 16 to 128, in the maximum number of Prime hosts that can be accommodated on a single Ringnet.

Additionally, in a separate an-

nouncement, Prime introduced the Ringnet Repeater, a device that extends the geographical reach of Ringnet.

Previously, the maximum distance between systems in a Ringnet was 750 feet, but with repeaters, links between network nodes can be extended in 750-foot intervals, according to Prime.

By using fiber-optic cable instead of the usual coaxial cable, distances between network systems or repeaters can range up to 3,280 feet, or one kilometer.

Slated for availability this month, the coaxial version of the repeater costs \$3,000, and the fiber-optic version costs \$5,000.

Following the route of other mini-computer manufacturers, Prime said that it, too, will announce an Ether-

net-type local-area network based on the IEEE's 802.3 international standard, which specifies physical and link-level network protocols.

Prime to conform

The company also stated that it would conform to the layered architecture of the International Standards Organization for the higher level network protocols where compatible with similar draft specifications from the National Bureau of Standards.

"The new [local-area network] will be integrated with Prismnet" and enable users "to execute existing applications on the new [local-area network] without changing their software," the company claimed.

Prime is located in the Prime Park, Natick, Mass. 01760.

AT&T from page 81

The Office Manager services, available to customers who choose to have an AT&T 3B computer installed on their premises, are said to provide the full integration of telecommunications system management and general processing. It consists of two modules: the Executive Planning, Information and Communications (Epic); and general processing.

Epic is an office system that utilizes a teleterminal to provide enhanced calling services.

The Advanced Communications Package is scheduled to be made available to the devoted Bell operating companies in the third quarter of this year.

AT&T Technologies, 222 Broadway, New York, N.Y. 10038.

IEEE from page 81

ogy throughout an enterprise."

The emergence of a common standard for industrial local-area networks represents a significant step forward for the factory and user wishing to network multiple applications devices on a large-scale basis, and for local-area network manufacturers who have targeted this high-growth market segment.

It is important to examine why the Froway committee, network vendors, industrial OEMs and end users have focused on the IEEE 802.4 token-passing bus standard as the preferred solution for factory networking.

■ The advantages of the token-passing access method, combined with broadband cable, particularly benefit the factory. Sophisticated manufacturing techniques, such as those utilizing process control, robotics and computer-aided design and manufacturing, require high-speed, deterministic communications systems with extremely low error rates.

■ Unlike carrier-sense multiple access with collision detection (CSMA/CD) technology, token passing, as defined by the IEEE 802.4 standard, is, under normal operating conditions, a deterministic access technique. This means that network managers can calculate the maximum delay time required for network access under any kind of load and can assign priority levels of access to the network.

■ Token passing is inherently less sensitive to network loading than CSMA/CD techniques, primarily because as the load on a CSMA/CD network increases, so does the occurrence of collisions which can lead to sudden and rapid performance degradation. In addition, token-passing networks are far less sensitive to distance than CSMA/CD networks.

Many factory end users, as well as users in a DP environment, endorse the use of broadband CATV cable.

In many instances, large facilities already have installed broadband cable systems for applications such as security monitoring and teleconferencing.

CATV is a mature technology and provides for extended distances and large bandwidth to accommodate data, voice and video applications simultaneously. Baseband communications systems are subject to various distance limits. Fiber optics is still an evolving technology but holds promise for the future.



WIZARD MAIL . . .

"the affordable* electronic mail"
for IBM Host Computers

Ask for our brochure (803) 244-4110

STEEL HEDDLE COMPUTER PRODUCTS • BOX 1867 • GREENVILLE, SC 29602 • USA Telex 4060106 STEHEDCO

* Less than \$1,000.00

SYSTEMS & PERIPHERALS



HARD TALK
Tom Harbert
On Every Issue

The difficult side of new technology

It's no secret that in order to meet the growing performance demands of users, mainframe vendors are going to have to make updates to aging system architectures. The big challenge, of course, is to make those changes without forcing users into making painful conversions or scrapping existing systems. That dichotomy has recently raised three interesting situations that exemplify the delicate balance involved in maintaining a peaceful user-vendor relationship.

A year ago, Digital Equipment Corp. outraged users of its Decsystem-10 and Decsystem-20 mainframes when it announced — at a user meeting, no less — that it was scrapping plans to develop a successor to the aging Decsystem line [CW, May 30, 1983]. At the time, many users and industry watchers got the impression DEC was giving users an ultimatum — convert to another processor line (in this case the VAX) — or else.

A year later, DEC announced what appears to be appeasement to those disgruntled Decsystem users — new versions of the Decsystem-10 and 20, which offer 20% more performance than the older versions [CW, May 14]. DEC, while sticking by its commitment to the VAX, also offered three software packages aimed at making it easier for Decsystem users to keep their systems and gradually move over to the VAX line.

Two weeks ago [CW, May 21], IBM made an obvious peace gesture to mainframe users whose systems were made less valuable by newer technology. Back in February [CW, Feb. 27], IBM replaced its 3080 line of processors with newer X models, which use a newer circuit-packaging technique and offer more performance at the same price as the older systems. While IBM certainly did not abandon the users of the non-X models, it did not offer them a field-upgrade migration path to the newer machines either. The result: Many observers expect the residual values of the older non-X model CPUs to drop significantly.

See FACTS page 92

Level 62 growth path expanded Honeywell taps DPS 4 as upgrade option

WALTHAM, Mass. — Honeywell, Inc. last week announced that domestic users of the firm's Level 62 small-scale mainframe processors can now migrate to the firm's DPS 4 processor line.

The upgrade path, which has been available to many users outside of the U.S. since 1980, offers certain Level 62 users an easier growth path to a newer technology processor. Previously, the only migration path available to domestic Level 62 users was to Honeywell's larger DPS 7 mainframes.

A company spokesman explained the DPS 4 was designed to use the firm's Gcose 4 operating system. That operating system is a superset of the Gcose 63 operating system used on the Level 62. The DPS 7 uses the Gcose 64 operating system, which requires users to make a software conversion, the spokesman said.

The DPS 4 migration path is aimed at Level 62 users who have a hard time justifying migration to the more powerful DPS 7. The spokesman said typical users of the DPS 4 processor are companies of less than 100 employees that have annual revenues of approximately \$100 million or less. The company added that users who migrate to the DPS 4 still have the option of migration to the DPS 7 at a later date.

The DPS 4 control system incorporates large-scale integration and very large-scale integration technology. It uses a 32-bit bus that connects, in parallel, up to four independently operating processors. The DPS 4 offers a main memory capacity

See DPS 4 page 90

Harris DDP 1600 line gets additions; 16-bit CPUs offer IBM compatibility

By James Connolly
CW Staff

DALLAS — Harris Corp. has announced four entry-level, 16-bit, distributed data processing (DDP) systems featuring IBM compatibility.

The additions to the 1600 DDP line, announced by Harris' Distributed Products Division, are based on 16-bit Harris processors that support 256K bytes of main memory and various peripherals including printers, disk drives and terminals. They support up to 16 workstations and use

Harris' Ecos operating system.

According to the company, the systems were designed for the first-time DDP user and allow for upgrades. They support applications such as data entry, word processing, personal computing and interactive Cobol. They offer IBM 3370 and batch communications with IBM Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) and Binary Synchronous Communications (BSC) protocols.

See DDP page 90

Kodak targets links with graphics

By Jeffrey Beemer
CW West Coast Bureau

ANAHEIM, Calif. — A leading manufacturer of photographic products has begun integrating corporate micro and mainframes in an effort to develop what the company considers the ideal system for creating business graphics.

The ultimate goal of Eastman Kodak Co.'s integration project is to produce an intelligent workstation that will support high-quality graphics packages and transmit charts back and forth between remote users and central mainframes.

Kodak aims to complete the workstation's development by year's end and to begin making the product available solely for internal consumption sometime in 1985, according to the firm's in-house graphics consultant, John Squilla.

Details of Kodak's workstation development plans emerged recently during a program session at the fifth annual conference of the National Computer Graphics Association.

In Kodak's view, Squilla said, the idealized intelligent graphics workstation in-

See KODAK page 90

■ VoiceTek Corp. unveils standard, Unix-based voice mail system/87

■ Chip design said to cut power requirements of microcomputers and other electronic devices/87

INSIDE

Data Storage/87

Terminals/88

Printers/Plotters/88

Graphics

Systems/88



WE RENT TI PROFESSIONAL COMPUTERS AND PRINTERS



DATA RENTALS SALLS Inc.

Protect your investment in The National Computer Conference ... advertise in Computerworld's NCC Daily!

Computerworld's NCC Daily! is one of the best ways for you to bring prospective clients to your booth every day of the conference. There'll be other media coverage of this event, but none more timely and informative than NCC Daily!

The *Computerworld* staff will publish four separate daily issues, each one editorially unique. We'll report on each day's major announcements and speeches, and we'll outline upcoming events to help attendees plan their days. So you know every issue will be well read. Which means your ad is more likely to be seen. In fact, most readers will see your message not once, but four times.

To help get your story to as many show attendees as possible, we'll distribute 25,000 copies of NCC Daily! each day of the show. Monday through Thursday, free copies will be available both at the show and at the major convention hotels in Las Vegas. As people read through each issue to decide which booths to visit, you'll definitely want your message there, where everyone will see it.

Space is limited, so make your reservation today. The closing date for all four issues is June 4, 1984. Just call our National Sales Director, Ed Mardecki, at (617) 879-0700. Or call any of our convenient sales offices listed below.

To: Ed Mardecki, National Sales Director
CW Communications, Inc.
Box 880
Framingham, MA 01701

- ☐ Please send me an NCC Daily! rate card.
☐ Please have a sales representative call me.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BOSTON/375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700
CHICAGO/2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433
NEW YORK/Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 957-1350
ATLANTA/1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758
SAN FRANCISCO/300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330
LOS ANGELES/18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230

SYSTEMS & PERIPHERALS

Unix-based series of stand-alone, voice mail systems out

NEWTON, Mass. — Voice-tel Corp. has announced a family of stand-alone, computerized voice mail systems using the Unix operating system.

The VS 700 series supports from 100 to 2,000 users, depending upon the system selected. Message capacities range from 400 to

20,000 messages, or up to 55 hours of messages, according to the vendor.

The systems utilize the C programming language and the Digital Equipment Corp. Professional 800 processor.

The VS 700 is said to let users place, retrieve and forward voice messages, as well as verify delivery. It reportedly

allows messages to be placed at any telephone for retrieval at any time, and it also allows users to add their own remarks to received messages before forwarding these messages to other parties.

The VS 700 series can process up to 32 simultaneous voice transactions and fea-

tures a 10M-byte data and process storage capacity.

Each system includes a voice storage subsystem, universal telephone interface, control subsystem, a message management unit, data base disk storage and voice disk storage.

It is designed for use with existing telephone switching

systems, including both on-premise private automatic branch exchange systems and off-premise switching equipment.

A typical 1,000-user VS 700 system is priced at \$125,000.

Voice-tel is located at 81 Chapel St., Newton, Mass. 02155.

GE unveils chip at Electro '84

BOSTON — General Electric Co. recently introduced a chip which it said may reduce the size and power requirements of personal computers and other electronic products.

Announced at the Electro '84 conference here, the chip is said to supply the interface between the line voltage and the low voltage used by microprocessors. It can reportedly operate at voltages as high as 500 ac, converting line voltage to the requirements of the microprocessor. Currently, such a function is carried out by a circuit board containing discrete devices, logic relay circuitry and relays. Such a board can measure 1 1/4 by 3/4 in. The GE chip can sit on a fingertip.

Available in September, the chip reportedly can be used in printers and in plasma displays.

The unit requires 15% to 25% less power than current circuit boards providing the same function, GE said from 3135 Easton Trpk., Fairfield, Conn. 06430.

DATA STORAGE

STRETCH CORP. Model RTC-4000

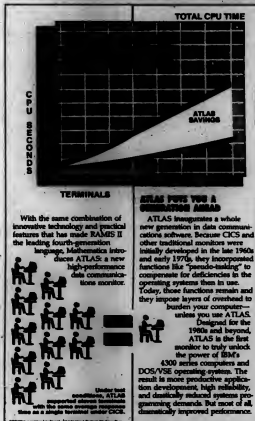
Stretch Corp. has introduced a 14-in. magnetic tape controller, Model RTC-4000, which interfaces industry-standard 14-in. magnetic tape units, microprocessors and cache tape systems to the Intel Corp. Multibus.

The RTC-4000 controls up to eight drive units with running speeds of 12.5 in./sec to 125 in./sec and supports tape densities of 800 bit/in. NRZI; 1,600 bit/in. phase encoded; 3,200 bit/in. phase encoded; or 6,250 bit/in. group code recording at 50 in./sec.

The controller features high-speed direct memory access transfers over the full Intel Corp. Multibus-compatible 24-bit addressing range without 64K-byte ad-

Continued on page 88

IF YOU KNOW RAMS II, YOU'LL UNDERSTAND WHY ATLAS™ BEATS CICS!



TEST ATLAS YOURSELF

In a recent test, ATLAS outperformed CICS/VS by more than 2 to 1 in both elapsed time and CPU time. And the heavier the load, the better ATLAS performed.

To find out exactly what the next generation in data communications can mean to your organization, try the ATLAS performance test on your computer. Whether you use ATLAS alone or together with RAMS II, you will be able to support more terminals, improve response time, and get more work done in the rest of your DOS/VSE partitions.

To arrange a free trial or for more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA
SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392, Princeton, NJ 08540

- ☐ I would like to try the ATLAS performance test.
☐ I would like additional ATLAS information.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Computer _____ Operating System _____

CW 5/88

RAMS II AND ATLAS...THE LEADERS BY DESIGN

Boston (617) 352-0020 Chicago (312) 694-0710 Dallas (214) 754-0710 Houston (713) 685-0007 Los Angeles (213) 694-0007
New York (212) 685-0007 San Francisco (415) 774-0710 Seattle (206) 461-0710
Washington, DC (202) 685-0710 Denver (303) 733-0710 Miami (305) 575-0710 Phoenix (602) 951-0710
Portland (503) 255-0710 Sacramento (916) 331-0710 St. Louis (314) 435-0710 Tucson (602) 281-0710
Waltham (617) 885-0710 Wichita (316) 264-0710

SYSTEMS & PERIPHERALS

Continued from page 87
cross boundary restrictions. The HTC-4000 is compatible with any drive that complies with the industry-standard formatted Perotec Computer Corp. interface.

To speed implementation on site, the controller is supplied with a Unix driver, the vendor said.

The price of the controller is \$1,195.

Spaced, 6465 Nancy Ridge Drive, San Diego, Calif. 92121.

PRINTERS/
PLOTTERSVERTICOM, INC.
Diablo Series C printer

Verticom, Inc. has announced that it is adapting Diablo Systems, Inc. Series C Ink-Jet printers for use with Verticom's PLP100 and PLP200 color graphics terminals.

Verticom is reselling the

printers after adding firmware.

The printer reportedly works in two modes, one for printing Ascii characters and one for printing bit-mapped graphics. Verticom said that the 4,096 colors usable on the terminals are reproduced on the printer in graphics printing mode with twice the resolution of the Verticom terminal.

Text characters printed in character mode reportedly

use a 12- by 16-dot matrix.

The Diablo printer is designed to print on transparencies, as well as on paper. Printing is controlled from the Verticom keyboard. The user reportedly can print one graphics page while working on another.

The printer, intended for marketing to OEMs and large end users, costs \$2,300.

Verticom, 546 Weddell Drive, Sunnyvale, Calif. 94089.

GRAPHICS
SYSTEMSWESTWARD
TECHNOLOGY, INC.
3219W; 3239W

Westward Technology, Inc. has announced two graphics workstations.

The 3219W monochrome workstation is said to feature a noninterfaced screen with a 2,048- by 1,665-pixel resolu-

TERMINALS

DECISION DATA
COMPUTER CORP.
5761

Decision Data Computer Corp. has unveiled a CRT workstation said to be compatible with IBM Systems/34, 36 and 38 computers.

Among the features are a 14-in., tilt-and-swivel display, an adjustable keyboard and a six-ft. detachable coiled cable from the keyboard to the monitor. The unit also has a green-phosphor screen with a 24-line by 80-char. display.

It also has work-pad memory, which allows the user to store a full screen of information in the workstation. This reportedly enables the user to scroll through data and manipulate it from one screen to another.

The 5761 costs \$4,077.

Decision Data Computer, 100 Witmer Road, Horsham, Pa. 19044.

FALCO DATA
PRODUCTS, INC.
TS-2624B

Falco Data Products, Inc. has announced the TS-2624B data entry terminal, an emulation of the Hewlett-Packard Co. 2624B.

The terminal can display 24 lines by 80 col. or 132 col., according to the vendor. Features include reverse video, half-bright, underline and blank fields. For reducing traffic between the user and host systems, the TS-2624B has block-edit and alternate-mode features.

The terminal's cache memory of 31 blocks of 256 bytes (the same as the HP terminal) allows users to program without accessing the host. A security feature allows checking for illegal data.

The standard screen is a 12-in., green P31 phosphor screen. Standard ports are two RS-232Cs; RS-412 or current loops are optional. Transmission rate ranges from 60 bit/sec to 9,600 bit/sec, the vendor said.

A TS-212 Plus modem operating at either 1,200 bit/sec or 300 bit/sec is another option.

Falco Data Products, 1206 Lawrence Station Road, Sunnyvale, Calif. 94089.



SYSTEMS & PERIPHERALS

tion and a picture that is redrawn almost 60 times per second. It also reportedly features a drawing speed of up to 280 nsec per pixel in vector mode.

According to the vendor, the 3219W produces a flicker-free picture. An optional second memory plane reportedly allows users to further improve the picture with Westward's line-smoothing technique (antialiasing).

The 3230W color worksta-

tion features Westward's custom very large-scale integration design. It is said to have four bit planes with up to 16 colors displayable from a palette of 4,096 colors. It is also available in an eight-plane version offering 256 colors from a palette of 16 million.

The vendor said that the ability to define subtle color differences means the 3230W is suitable for demanding applications such as carto-

graphy and three-dimensional solid modeling.

The 3219W costs \$14,900, and the 3230W costs \$15,450.

Westward, 80 Montvale Ave., Stonyham, Mass. 02180.

ADVANCED ELECTRONICS DESIGN, INC.

Colorware System 23

Advanced Electronics Design, Inc. has introduced a

line of color graphics workstations, the Colorware System 23, for Digital Equipment Corp.-compatible independent sales organizations and systems integrators, the vendor said.

The products reportedly provide interactive processing capabilities, full-color display and local data storage for applications such as computer-aided design.

The Colorware System 23 is available in three models,

the 23/16, the 23/7 and the 23/5, according to a vendor spokesman.

It reportedly offers local processing capability with the capacity to view information at resolutions of 1084 by 768 pixels, 768 by 576 pixels or 512 by 512 pixels on a 19-in. color monitor. Each model can display 256 colors simultaneously, from a palette of 16.7 million, according to the vendor.

Other features reportedly include firmware antialiasing on the 23/10 and 23/7, command protocol of over 90 commands and polygons 516. Independent manipulation of the eight video memory planes, using read-write masking, is said to permit users to develop color overlays.

The model 23/10 workstation is priced at \$26,500, the 23/7 at \$24,000 and the 23/5 at \$21,500, according to the vendor.

Advanced Electronics Design, 440 Polvere Ave., Sunnyvale, Calif. 94086.



NAMEWARE

- AMSI
Saratoga, CT
Video/data telephones
(formerly Digital Transactions)
- COMTEC
Olathe, MO
Business/financial software
(formerly Cluser Systems)
- COMPAQ
Houston, TX
Portable computers
(formerly Gateway Technology)
- COMSERV
Oakland, CA
Business telephone systems
(formerly Tech-Solution)
- DATAWARE
New York, NY
Computer stores
(New venture of NetNet)
- DATAWARE
Costa Mesa, CA
Software for IBM PC
(formerly Caltech Software)
- DCS
San Francisco, CA
Computer supplies
(New venture of Crown International)
- EMERSON
Sunnyvale, CA
Mixed computers
(formerly R-8 Computers)
- EMERSON
San Diego, CA
Software transaction systems
(formerly Publishing Technology)

BY NAMELAB

Contact us for free literature on product and company name development

NAMELAB INC.
Name Development & Testing Laboratory
701 Marina Boulevard
San Francisco, CA 94123 • 415-563-4639

That's what
we're here for
Int

SYSTEMS & PERIPHERALS

KODAK from page 85

corporate three key elements — a library of highly capable software packages, IBM 3270 color terminal emulation and the ability to upload and download files to and from host processor.

Using these three prerequisites as a guide, the company recently selected 10 graphics software packages for potential inclusion in the planned workstation and

evaluated their performance according to various criteria. All 10 programs operate with IBM's Personal Computer.

After ascertaining which of the prospective packages provides the best features, Kodak intends to combine the software with the organization's in-house IBM Personal Computers. Also slated for addition to the Personal Computers will be a 3270 emulation capability and a micro-to-mainframe link, which

will support both uploading and downloading.

Kodak's efforts to develop its own intelligent graphics workstation highlight a question that the business world is increasingly having to address: Which is the better vehicle for generating charts — mainframes or micro?

The answer is that both alternatives have their virtues and trade-offs. Mainframes offer the advantages of large

amounts of graphics power and huge data bases, but are expensive to use and are seldom readily accessible. Personal computers, on the other hand, lack many of the powerful capabilities of much bigger systems, but compensate for the deficiency with their superior responsiveness and friendly user interface, Squilla said. Neither micros nor mainframes are universally effective as graphics tools.

So the only way for users to devise a conservative solution to their graphics problems is to marry personal computers and mainframes and obtain the best of both worlds. That integrated approach to meeting business graphics needs is mirrored in Kodak's ongoing efforts to develop an intelligent workstation that unites the company's micros and host processors, Squilla said.



State-of-the-art
payroll personnel software
to help you improve the
state of your organization

Are you interested in THE HUMAN RESOURCE MANAGER?

☐ Please have a sales representative contact me at (phone).

☐ Please send information.

Name _____

Title _____

Organization _____

Address _____

City _____ State _____ Zip _____

THE HUMAN RESOURCE MANAGER is a trademark of Personnel Data Systems, Inc.

Whittemarsh Plaza
15 East Ridge Pike
Cranston, PA 19020
215-688-4234

PDS

Personnel Data Systems, Inc. CW 8/83

DDP from page 85

System 1 of the series was designed to provide concurrent data entry, word processing, personal computing and remote job entry functions. It is said to support up to eight workstations, system and workstation printers and any one of several communications interfaces. System 2 was designed for DDP applications requiring magnetic tape backup and fixed-disk storage. It includes a 400k-byte Windows fixed disk and a 1,600 bit/in., 9-track streamer tape unit with start/stop and streaming modes.

System 3 is said to feature the capabilities of System 1 plus IBM 3270 communications. Supporting eight terminals, it is said to switch from DDP mode to 3270 mode with a keystroke.

System 4 includes all of the functions of the first three systems and supports up to 16 workstations, according to Harrie. It is said to provide batch and 3270 communications in BSC or SNA.

Prices vary according to the configuration ordered. A typical System 3 configuration is priced at \$63,373. The systems are available now.

Harrie, 10001 Dallas Fwy., Dallas, Texas 75240.

DPS 4 from page 85

ranging from 512K bytes to 8M bytes, the firm said.

The DPS 4 is available to domestic Level 63 users on a purchase-only basis and will be available in September. A typical DPS 4 configuration costs \$71,340. Some users who migrate to the DPS 4 will be able to keep the same mass storage devices, communications terminals and system console used on the Level 62, Honeywell said.

Central system expansion costs \$5,000 for each 512K-byte memory increment. A second instruction processor costs \$30,065, and a second disk processor costs \$17,542. Network control processors cost \$5,299 each, Honeywell said, and a maximum of three can be used.

The monthly license fee for Genes 4 is \$400, the vendor said.

Honeywell is located at 200 Smith St., Waltham, Mass. 02154.

At CCA's seminar you'll learn about the Intelligent Information Center™ and the newest DBMS tools, like PC-mainframe links.

Attend one of CCA's seminars and you will learn how MODEL 204 DBMS can make both MIS people and corporate executives better at their jobs. You could also win your very own IBM PC.

How MODEL 204 DBMS's new Intelligent Information Center provides complete end user support.

MODEL 204's Intelligent Information Center, a unique group of tools linking end users and computers, allows executives to access the corporate database themselves. Without having to understand anything about mainframe technology.

At the seminar, you'll actually see two of these executive tools in action. One is PC/204, our easy to use PC-mainframe link for automatic spreadsheet definition and creation. The other is ACCESS/204, our decision support query and report writer.

Why time after time MODEL 204 DBMS is so highly rated for ease of use and high performance.

It's true. In recent DATAPRO surveys, MODEL 204 consistently won high marks for Efficiency, and for Ease of Use.

You'll learn why the performance of MODEL 204 is unmatched. And why its complete 4th generation application development system improves productivity 5 to 50 times over conventional methods.

By then you'll understand why MODEL 204 is the fastest growing database management system.

How you can win an IBM PC.

Select a seminar from the schedule below and call or send a coupon to reserve your place. At every seminar, you can enter your name into our drawing for an IBM PC. The winner will be selected from 1984 seminar attendees. The winning name will be drawn Dec. 28, 1984.



You could even win a PC.

CCA's Executive DBMS Seminar Schedule

| | | | | |
|-------------|---------|------------------|---------|---------------|
| June | | | July | |
| Albuquerque | June 14 | Philadelphia | June 5 | July 10 |
| Boston | June 14 | Pittsburgh | June 19 | July 12 |
| Buffalo | June 5 | Oklahoma City | June 7 | Portland, OR |
| Chicago | June 14 | Omaha | June 7 | San Francisco |
| Denver | June 21 | Rochester | June 28 | St. Louis |
| Hartford | June 21 | Saddle Brook, NJ | June 28 | August |
| Nashville | June 5 | Syracuse | June 27 | Houston |
| New York | June 21 | Washington D.C. | June 12 | Aug. 21 |
| | | | | Los Angeles |
| | | | | Aug. 30 |
| | | | | Minneapolis |
| | | | | Aug. 28 |
| | | | | San Mateo |
| | | | | Aug. 28 |

Representatives: Canada, U.K., Europe, Australia, Japan, Saudi Arabia. In Canada, contact Polarix Computer Systems Ltd., Toronto.

Intelligent Information Center is a trademark of Computer Corporation of America.

Computer Corporation of America

() Yes, I'm interested, I'd like to attend. Please call me with details. () I can't attend right now. Please send me information on MODEL 204.

NAME _____ TITLE _____
 COMPANY _____
 ADDRESS _____
 CITY _____
 STATE _____ ZIP _____
 TELEPHONE _____

Operating System: () MVS () DOS () CMS () Other: _____

Computer Corporation of America, 80 A Concord Company
 Five Cambridge Center, Cambridge, MA 02142 (617) 492-3800

CCMA84

When You Need Computer Equipment Moved!

Rely On Experts

- One-Day Pick-up and Delivery
- Competitive Rates
- Specially Equipped Radio Dispatched Trucks
- Air Freight Handling
- Warehouse Facilities
- Full Insurance Coverage

Serving Southern California Since 1970

For more details,
call toll-free:

(800) 821-5270

U.S. except Calif.

(800) 521-5537

California



**Southern California
Delivery Service
Computer
Transportation, Inc.**

2914 E. 46th Street, Los Angeles, CA 90068

Introducing the new NCR COM Systems

Designed for people who thought they couldn't afford high-speed computer output.

A state-of-the-art COM system is now within your budget. And more than that, when you select the NCR 5310 or 5320, you'll enjoy the latest technology and the best value in COM systems.

Controlled by the versatile NCR Personal Computer, these two COM systems offer the most cost-effective methods of producing microfiche today.

Of course that NCR PC is only one of the reasons these COM

systems are among the most advanced in the industry. For further proof, take a look at the other features you can have working for you:

- wet or dry film processing
- highly sophisticated camera system
- self-loading streaming tape drive
- optional console printer
- job statistics
- detailed diagnostics
- upgradable to NCR mini-computer COM systems

Learn more about the affordable COM systems: the 5310 and 5320. Call or write NCR Micrographic Systems Division, 520 Logue Ave., Dept. 1650, Mountainview, CA 94043. 1-800-227-9964.

NCR

1954-1984
Celebrating 30 Years



SYSTEMS & PERIPHERALS

FACTS from page 85

When IBM announced the X models, it undoubtedly knew users would be upset. To quell that anger, the firm cut the model-to-model upgrade prices for the older systems and slashed maintenance prices to meet those offered on the newer CPUs. But those actions still left some users out in the cold. For example, users of the 3061 Model K processors did not have much of an upgrade path.

They could buy another CPU and convert their systems to a 3064 complex, but many of the users were not willing to make such an expensive upgrade.

So, two weeks ago, IBM announced a relatively inexpensive (\$16,000) performance upgrade kit that offers users of non-X models the chance to

add a little extra performance (roughly 6%). That extra performance may be just enough to tide some users over until IBM unveils its rumored Sierra line of mainframes later this year.

While IBM and DEC surprised users with unpopular news, Compu Data Corp. took the opposite approach. When it announced the newer technology Cyber 180 series of mainframes (CW, April 30), the firm told users of the Cyber 170 Model 856, 846 and 866 systems that they had a spare instruction set hidden in their systems that would allow them to run a new version of the CDC N08 operating system called N08/VE.

Some confusion

While this approach seems to be dumping bad news on users, it also may wind up causing some confusion.

For example, when users bring up N08/VE on the Cyber 170 856, 846 or 866, do they then own Cyber 180 machines, or do they still have older Cyber 170 machines?

It is clear that switching to new system architectures may not always be a painless process. It is very difficult to develop a truly new product and still make it totally compatible with older systems. Progress sometimes hurts; but the results ultimately benefit the user community as a whole.

But the fact that some users wind up suffering more than others is a problem. Vendors must realize that introducing new systems takes just as much political savvy with the user community as it takes technical wizardry in the laboratory.

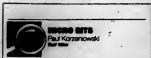
Users in the lurch

Of the three recent cases, DEC appears to have done the worst job of playing the political game. Both users and industry watchers alike got the impression DEC left its Decsystem users in the lurch. DEC says its intentions were misunderstood — it always planned on providing additional support to Decsystem users, the products were just not ready until early May.

IBM, which in the past has tread on this ice with its users, at least managed to soften the blow to non-X model users with price cuts and performance increases. In fact, some industry watchers contend some of the non-X models are now better deals than the newer systems. And CDC's surprise attack technique is certainly unique. It indicates CDC was thinking about its current user base when it developed the Cyber 180 line. But the firm may find itself going through a phase where some users are not quite sure whether they own an old-technology processor that has been retrofitted with a new operating system or a new-technology processor that was originally disguised as an old-technology processor.

These three cases are just the beginning. As more vendors depart from their mainstay mainframe architecture, there will be more upset users. But there will also be better processors. It is an inevitable trade-off that as newer technologies are incorporated into computer systems, there will be more cases of incompatibility with existing systems. Some users will just have to grin and bear the inconvenience caused by incompatibility. But some will surely grin less often than others.

MICROCOMPUTERS



Many micro terms remain undefined

Integrated, compatibility, portable, supermicrocomputer, user-friendly, artificial intelligence... What do these terms mean? Ask two vendors, receive two conflicting answers. Ask two users, and they shrug their shoulders.

Historically, technical advancements in the computer industry have clouded distinct product categories. With the advent of personal computers, many product definitions have been reduced to meaningless buzzwords.

With hundreds of hardware companies and thousands of software companies peddling products, vendors have difficulty determining how to market their offerings. The easy approach is net-to-market: finding the best-selling software package or microcomputer and then asserting that your product is just like the best-seller.

Soon after Lotus Development Corp. reached the top of many software sales lists with the 1-2-3 integrated package, other software vendors began advertising that their products were also integrated. Some product lines featured similar command structures for various applications; other packages were able to share data files created by distinct applications.

But unlike 1-2-3, many packages were not able to load various applications into random-access memory, did not provide a central data file and did not allow users to switch from one program to another with a single keystroke. Despite the lack of these capabilities, other companies kept stating that their products were integrated.

'IBM-compatible'

Similar misconceptions occurred with hardware. As the IBM Personal Computer's sales increased, so did the number of "IBM-compatible" microcomputers.

Many compatibles merely ran Micro-soft, Inc.'s MS-DOS operating system and were unable to run software that made IBM Personal Computer hardware calls. In some cases, compatibility was physically impossible. In one case, ACT Ltd. maintained that its Apricot microcomputer was IBM-compatible, even though the Apricot possesses 514-in. disk drives and the IBM micro has 5¼-in. disk drives.

While some manufacturers try to mimic best-selling products, others coin new terms to differentiate their products. Although most people understand the difference between a Radio Shack Model 100 and a Compaq Computer Corp. Compaq, many have difficulty determining the difference between portable and transportable.

When Kaypro, Inc. initially announced its line of microcomputers, David Kay, marketing vice-president, chose a television set analogy to define portable. If one could easily pick up the computer and plug it into an electrical outlet

See "IBM" page 90

Otrona unveils portable micro IBM-compatible system converts to desktop

BOULDER, Colo. — A 15-lb portable microcomputer that converts within seconds to a desktop system and is said to be 100% IBM-compatible was introduced this month by Otrona Advanced Systems Corp.

Otrona has targeted the new system toward Fortune 1,000 firms, government organizations, scientific/engineering groups and other users needing a portable system, Otrona President James Lindner said.

The new Otrona 2001, selling for \$2,495, features an Intel Corp. 8086 processor; 128K bytes of random-access memory (RAM); a 7-in. flat-screen amber display; a 240K-byte floppy disk drive; an RS-232 port and a parallel port; and a composite/red-green-blue external monitor interface, according to Otrona.

Expansion options are said to include a second floppy disk drive; a fully portable 10M-byte internal hard disk; additional memory up to 640K bytes of RAM; a Zilog, Inc. Z80B processor and Digital Research, Inc.'s CP/M operating system; an Intel 8087 coprocessor; a 8001/300 Hz/sec internal modem; a real-time clock; a graphics board; additional asynchronous and syn-



Otrona's 2001

chronous ports; and an internal dc power option.

Users can convert System 2001 from a portable to a desktop setup by removing the 7-in. display (which requires no tools) and adding either a 13-in. color or a 12-in. monochrome display, the company said.

Otrona claimed that the 2001 runs all IBM software off the shelf. The system accepts up to three IBM-compatible boards, the company added.

The 2001 is immediately available, Otrona said.

The firm also announced that ship-
See 2001 page 90

IBM Personal Computer Assistant series shares data files among applications

BOCA RATON, Fla. — IBM has announced the IBM Personal Computer Assistant series, a collection of integratable application programs that run on the IBM Personal Computer, Personal Computer XT, Portable Personal Computer and PCjr.

Software Publishing Corp. in Mountain View, Calif., creators of the FPS software line, wrote the programs. "The writing, filing, reporting and graphing programs are enhanced versions of current FPS series programs," said Rich Scott, an IBM spokesman. Data files can be shared among different applications, IBM said.

The Assistant series consists of Writing Assistant, Filing Assistant, Reporting Assistant, Graphing Assistant, Planning Assistant, Executive Solutions, Accounting

Solutions and Home Solutions.

Writing Assistant, which costs \$149, includes a 125,000-word spelling checker, IBM said. Filing Assistant, also available for \$149, reportedly allows a user to link distinct data bases. Reporting Assistant is said to feature ascending and descending sort capabilities and use of the Enter key rather than the F10 key. It costs \$129. Graphing Assistant, selling for \$149, reportedly produces bar or pie graphs. Planning Assistant, available for \$149, permits users to create a spreadsheet with an unlimited number of rows and columns, according to the vendor.

Executive Solutions, Accounting Solutions and Home Solutions are three tem-
See ASSIST page 90

Molecular offers multiuser system

SAN JOSE, Calif. — Molecular Computer has introduced the Series 9, a multiuser, multiprocessor system capable of running Digital Research, Inc.'s CP/M 80, MP/M 80, and MP/M 86 and Microsoft, Inc.'s MS-DOS operating systems.

The system is based on Molecular's N-star network operating system, which is said to provide file-sharing and inter-processor communications capabilities.

Series 9 reportedly supports nine processor cards, which can serve as user processors, dedicated spool queue processors, tape backup processors, clustered communications controllers and electronic mail gateways.

The processor cards come in two configurations, Molecular said. AP/186 features an Intel Corp. 8086 microprocessor and 256K bytes of random-access memory (RAM) and can run CP/M 80, MP/M 80 and MS-DOS applications. AP/80X consists of a Zilog, Inc. Z80A microprocessor, 64K bytes

of RAM and two RS-232 serial ports. This 8-bit card can run CP/M 80 and MP/M 80 software, according to the vendor. The cards are connected to Molecular's M-bus, a interprocessor link said to operate at a speed of 400K bytes/sec.

The central system has a Zilog Z80B microprocessor, 128K bytes of RAM, 20M to 40M bytes of hard disk storage, a 360K-byte floppy disk drive and optional printer and tape backup units.

Dumb terminals can be connected to the firm's Terminal Concentrator Processor (TCP), an eight-port multiplexer that includes an AP/186 microprocessor and 256K bytes of RAM.

A Series 9 system with a 30M-byte hard disk costs \$7,995; a 40M-byte hard disk system sells for \$9,995. The AP/186 lists for \$1,895, and the AP/80X costs \$995. TCP sells for \$1,895.

Molecular Computing is located at 251 River Oaks Pkwy., San Jose, Calif. 95134.

■ Velcorp drops prices for its Vision integrated package — again/84

■ Franklin Computer Corp. introduces a line of Apple Computer, Inc. Apple II-compatible machines/84

■ A package from Digital Research, Inc. converts the IBM Personal Computer to a four-user system/88

INSIDE

Software/88

Systems/88

Storage/88

Printers/Plotters/88

Board-Level Devices/88

Auxiliary Equipment/88

Communications/88

MICROCOMPUTERS

Franklin brings Apple II-compatible portables to mart

NEW YORK — Franklin Computer Corp. earlier this month brought to market its second wave of microcomputer products, a line of transportable microcomputers compatible with Apple Computer, Inc.'s Apple II, but based on a proprietary operating system.

Ranging in price from

\$1,400 to \$2,300, the CX series of 25-lb microcomputers ranges from a system with 64K bytes of random-access memory and one disk drive to a 128K-byte machine. The machines are capable of running programs written for Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 2.2 operating systems, as

well as F-DOS, the Apple II-compatible operating system offered by Franklin.

The top-of-the-line CX-2M is reportedly fitted with a disk controller, enabling it to transport data files from disks formatted for IBM Personal Computers and compatibles as well as Kaypro, Inc. and Osborne Computer Corp.

machines. With this controller, the CX-2M will be available for \$2,300.

The four machines in the CX line are fully compatible with the Apple II+ only. The product line also includes:

■ The \$1,400 CX-1, which comes with one disk drive and 64K bytes of memory. It is available now.

■ The two-drive CX-2. Priced at \$1,700, it will be shipped in June.

■ The \$2,000 CX-2C, with 128K bytes of memory, two disk drives and a CP/M card. It will be available for \$2,000 in August.

All four CX models are fitted with a 7-in. monitor and detachable keyboard, Franklin said. Each system comes with a free diskette containing word processing and financial spreadsheet packages. The two models equipped with a CP/M card are accompanied by a free issue of Micropro International Corp.'s Wordstar software.

Franklin is located at 1070 Busch Memorial Highway, Pennsauken, N.J. 08110.

Visicorp Vision tools prices cut

SAN JOSE, Calif. — Visi-corp is offering a package of its Vision integrated productivity products for \$795 during a promotion ending June 30, the company said in mid-May.

The bundle features the Vision applications manager, Vision Calc, Vision Graph, Vision Word and the company's mouse input device, Visicorp said.

When Vision first shipped at year-end, this package was priced at \$1,766. Viacorp cut the price of the applications manager in January. The new bundle pricing represents a further \$615 drop from suggested retail prices, the company said.

Vision runs on the IBM Personal Computer XT and compatible machines equipped with hard disk drives, the company noted.

Visicorp is located at 2895 Zanker Road, San Jose, Calif. 95134.

USL DATA SYSTEMS: THE SOURCE FOR DATA PRODUCTS

RENT for a short-term, low-risk commitment. LEASE obsolescence and preserve capital equipment. BUY

to avoid obsolescence and preserve capital equipment budgets.

with much quicker delivery than most manufacturers.

Whatever options you choose in acquiring equipment, we back up every shipment with service. That means you can count on us for total product support, including maintenance and prompt follow-up on any problems or questions.

Business Computers
Microcomputers
Digital Equipment
Corporation
GRID

Hewlett-Packard
IBM
TeleVideo
Wang
Terminals
ADD6
Beehive
Datastream
Digital Equipment
Corporation
Hewlett-Packard
IBM
Lear Siegler
Teletype
TeleVideo

Printers
Centronics
Datascout
Diablo
Digital
Equipment
Corporation

Hewlett-Packard
NBC
Okidata
Pristonix
Teletype
TeleVideo
Data Communications
Equipment
Anderson Jacobson
Rixon
Ven-tel
IBM Compatible
Controllers
DataStream
Teletype

Nobody offers more.

USL Data Systems

A US Listing Company

USL Data Systems
2988 Campus Drive
San Mateo, CA 94403
Phone: (415) 572-6800

© 1984 LSI Data Systems

Call your local sales office for price & delivery quotations.

ELABORATE 1989 210-2146
 ELABORATE 1989 516-4195
 ELABORATE 1989 517-4426
 Call 1989
 Burbank 715-861-9884
 Los Angeles 313-427-5623
 Orange Co 714-454-2834
 San Diego 619-995-1714
 San Jose 415-779-1884
 (1989) 1989
 Denver 303-730-7271
 CHICAGO 773-715-1111
 1111-1111-1111
 1111-1111-1111

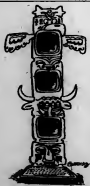
DIRECTRY OF CHURCHES
301-750-6130
FLORIDA (800) 242-2146
GEORGIA (404) 352-7000
ALABAMA (404) 914-1000
MISSISSIPPI (601) 326-0395
812-9486
Georgia (404) 799-7411
MISSISSIPPI (601) 312-7961
ALABAMA (404) 313-7961
KANSAS (913) 325-7961
NEW YORK (800) 325-7961
ILLINOIS (800) 527-4444
MISSOURI (800) 342-7961

Mediacall, Inc.
 800-457-1467
 MEDICAL (800) 525-
 1467
 (800) 525-1467
 MEDICAL
 (800) 525-1467
 MEDICAL (800) 525-
 1467
 MEDICAL (800) 525-
 1467
 MEDICAL (800) 525-
 1467
 MEDICAL (800) 525-
 1467

NEW JERSEY
 (201) 326-7000
 NEW YORK (212) 973-3300
 NEWYORK-CALIFORNIA
 (800) 455-3075
 OHIO (216) 325-7944
 OKLAHOMA (405) 271-
 0000
 OREGON (503) 325-3300
 PENNSYLVANIA
 (610) (215) 325-3000
 (717) (610) 325-7944
 RHODE ISLAND
 (401) 345-0000
 SOUTH CAROLINA

2024 (2024) 112-113
 2024 (2024) 114-115
 2024 (2024) 116-117
 2024 (2024) 118-119
 2024 (2024) 120-121
 2024 (2024) 122-123
 2024 (2024) 124-125
 2024 (2024) 126-127
 2024 (2024) 128-129
 2024 (2024) 130-131
 2024 (2024) 132-133
 2024 (2024) 134-135
 2024 (2024) 136-137
 2024 (2024) 138-139
 2024 (2024) 140-141
 2024 (2024) 142-143
 2024 (2024) 144-145
 2024 (2024) 146-147
 2024 (2024) 148-149
 2024 (2024) 150-151
 2024 (2024) 152-153
 2024 (2024) 154-155
 2024 (2024) 156-157
 2024 (2024) 158-159
 2024 (2024) 160-161
 2024 (2024) 162-163
 2024 (2024) 164-165
 2024 (2024) 166-167
 2024 (2024) 168-169
 2024 (2024) 170-171
 2024 (2024) 172-173
 2024 (2024) 174-175
 2024 (2024) 176-177
 2024 (2024) 178-179
 2024 (2024) 180-181
 2024 (2024) 182-183
 2024 (2024) 184-185
 2024 (2024) 186-187
 2024 (2024) 188-189
 2024 (2024) 190-191
 2024 (2024) 192-193
 2024 (2024) 194-195
 2024 (2024) 196-197
 2024 (2024) 198-199
 2024 (2024) 200-201
 2024 (2024) 202-203
 2024 (2024) 204-205
 2024 (2024) 206-207
 2024 (2024) 208-209
 2024 (2024) 210-211
 2024 (2024) 212-213
 2024 (2024) 214-215
 2024 (2024) 216-217
 2024 (2024) 218-219
 2024 (2024) 220-221
 2024 (2024) 222-223
 2024 (2024) 224-225
 2024 (2024) 226-227
 2024 (2024) 228-229
 2024 (2024) 230-231
 2024 (2024) 232-233
 2024 (2024) 234-235
 2024 (2024) 236-237
 2024 (2024) 238-239
 2024 (2024) 240-241
 2024 (2024) 242-243
 2024 (2024) 244-245
 2024 (2024) 246-247
 2024 (2024) 248-249
 2024 (2024) 250-251
 2024 (2024) 252-253
 2024 (2024) 254-255
 2024 (2024) 256-257
 2024 (2024) 258-259
 2024 (2024) 260-261
 2024 (2024) 262-263
 2024 (2024) 264-265
 2024 (2024) 266-267
 2024 (2024) 268-269
 2024 (2024) 270-271
 2024 (2024) 272-273
 2024 (2024) 274-275
 2024 (2024) 276-277
 2024 (2024) 278-279
 2024 (2024) 280-281
 2024 (2024) 282-283
 2024 (2024) 284-285
 2024 (2024) 286-287
 2024 (2024) 288-289
 2024 (2024) 290-291
 2024 (2024) 292-293
 2024 (2024) 294-295
 2024 (2024) 296-297
 2024 (2024) 298-299
 2024 (2024) 300-301
 2024 (2024) 302-303
 2024 (2024) 304-305
 2024 (2024) 306-307
 2024 (2024) 308-309
 2024 (2024) 310-311
 2024 (2024) 312-313
 2024 (2024) 314-315
 2024 (2024) 316-317
 2024 (2024) 318-319
 2024 (2024) 320-321
 2024 (2024) 322-323
 2024 (2024) 324-325
 2024 (2024) 326-327
 2024 (2024) 328-329
 2024 (2024) 330-331
 2024 (2024) 332-333
 2024 (2024) 334-335
 2024 (2024) 336-337
 2024 (2024) 338-339
 2024 (2024) 340-341
 2024 (2024) 342-343
 2024 (2024) 344-345
 2024 (2024) 346-347
 2024 (2024) 348-349
 2024 (2024) 350-351
 2024 (2024) 352-353
 2024 (2024) 354-355
 2024 (2024) 356-357
 2024 (2024) 358-359
 2024 (2024) 360-361
 2024 (2024) 362-363
 2024 (2024) 364-365
 2024 (2024) 366-367
 2024 (2024) 368-369
 2024 (2024) 370-371
 2024 (2024) 372-373
 2024 (2024) 374-375
 2024 (2024) 376-377
 2024 (2024) 378-379
 2024 (2024) 380-381
 2024 (2024) 382-383
 2024 (2024) 384-385
 2024 (2024) 386-387
 2024 (2024) 388-389
 2024 (2024) 390-391
 2024 (2024) 392-393
 2024 (2024) 394-395
 2024 (2024) 396-397
 2024 (2024) 398-399
 2024 (2024) 400-401
 2024 (2024) 402-403
 2024 (2024) 404-405
 2024 (2024) 406-407
 2024 (2024) 408-409
 2024 (2024) 410-411
 2024 (2024) 412-413
 2024 (2024) 414-415
 2024 (2024) 416-417
 2024 (2024) 418-419
 2024 (2024) 420-421
 2024 (2024) 422-423
 2024 (2024) 424-425
 2024 (2024) 426-427
 2024 (2024) 428-429
 2024 (2024) 430-431
 2024 (2024) 432-433
 2024 (2024) 434-435
 2024 (2024) 436-437
 2024 (2024) 438-439
 2024 (2024) 440-441
 2024 (2024) 442-443
 2024 (2024) 444-445
 2024 (2024) 446-447
 2024 (2024) 448-449
 2024 (2024) 450-451
 2024 (2024) 452-453
 2024 (2024) 454-455
 2024 (2024) 456-457
 2024 (2024) 458-459
 2024 (2024) 460-461
 2024 (2024) 462-463
 2024 (2024) 464-465
 2024 (2024) 466-467

NAME
ADDRESS
CITY
STATE
ZIP
COUNTRY



See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR. It's a VISUAL PROGRAMMING aid for MICRO FOCUS' LEVEL II COBOL. It runs on a micro. It makes child's play of mainframe test and maintenance chores.

With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.

See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.



Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303
I'd like more information

| | |
|---------|-----------|
| Name | Title |
| Company | Phone |
| Address | |
| City | State Zip |

© 1984 Micro Focus Inc. All Rights Reserved.
LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

CM 5/84C

MICROCOMPUTERS

Digital Research unveils link IBM interest group announces public-domain directory, disks

PACIFIC GROVE, Calif. — Digital Research, Inc. has announced Starlink, an expansion board and software, which transforms an IBM Personal Computer into a four-user system.

Starlink consists of an Intel Corp. 8086 microprocessor, 64K bytes of random-access memory (RAM), four RS-232 serial port connectors, connecting cables and Digital Research's Concurrent PC-DOS, which simultaneously runs four programs using either IBM PC-DOS or Digital Research's CP/M operating systems.

With Starlink, four terminals or microcomputers (not necessarily IBM-compatible) can be linked

through an RS-232 interface, according to the vendor. While users can share files and software, Starlink reportedly supports password protection and file locking so that specific information can be kept from unauthorized users, Digital Research said.

Starlink requires 512K bytes of RAM and runs on an IBM Personal Computer with two double-sided floppy disk drives or on an IBM Personal Computer XT. Digital Research recommends that the microcomputer have a hard disk.

Product shipments are planned for June. Starlink costs \$1,695.

Digital Research is at 160 Central Ave., Pacific Grove, Calif. 93960.

SANTA CLARA, Calif. — The IBM Personal Computer Software Interest Group (PC-SIG) has announced a directory that lists hundreds of public-domain and user-supported programs written by authors who have chosen not to market their software.

Users can make copies of the programs without charge, the group said. Most public-domain programs are available in original source code form, allowing users to make modifications and provide examples of how to program.

The directory is available at book-

stores or directly from PC-SIG for \$4.95 plus \$1 postage and handling. A set of the 10 most popular disks is priced at \$50, and the complete set of 135 disks costs \$514.

PC-SIG has its headquarters at Suite 130J, 1556 Halford Ave., Santa Clara, Calif. 95051.

SOFTWARE

CLARITY SOFTWARE CORP. IIF-Exit

Clarity Software Corp. has introduced a program that translates Execucom, Inc.'s Interactive Financial Planning System (IFPS) models and data files into spreadsheet formats for Lotus Development Corp.'s 1-2-3 and VisiCalc.

The program, IIF-Exit, reportedly operates under PC-DOS on an IBM Personal Computer or Personal Computer XT and requires 96K bytes of memory, two disk drives and a monitor. The program is said to be a two-pass system. In the first pass, the model is read, and a symbol table of variable names is built. In the second pass, the model is re-read, and cell addresses and cell calculations are conducted.

IIF-Exit costs \$3,000 for a one-time license fee, which permits unlimited copies of the program to be distributed within an organization, the vendor said. After June 30, the price will increase to \$4,000.

Clarity Software, 11108 Spicewood Plaza, Austin, Texas 78750.

R SYSTEMS, INC. R Word

R Systems, Inc. announced its R Word word processing package is available for the IBM Personal Computer and the Texas Instruments, Inc. Professional computer.

Written in assembly language, R Word reportedly consists of several programs offering mail/merge, table math, spelling check and data base capabilities, according to R Systems.

Among the word processing software's features are the choice of eight colors as backgrounds, reverse video and underlined or highlighted text. A three-level file structure is used for document organization, R Systems said. The product is said to allow basic typing and filing tasks and the production of documents containing headers, footers, tables and footnotes.

R Word requires 256K bytes of internal memory, uses either single- or dual-diskette drives and operates with a color monitor.

The package is offered for \$306. R Systems, 11450 Papernall Road, Dallas, Texas 75245.

MICROSYSTEMS ENGINEERING CORP. MassType

Microsystems Engineering Corp. has introduced a new version of its word processing package that runs on the Digital Equipment Corp. Rainbow, IBM Personal Computer and Ra-

Now is the Time to Take a Look at

FUJITSU

In today's information revolution there is one company well worth watching. A company which brings experience and expertise to the development, manufacture, marketing and support of OEM and consumer computer peripheral products in America. That company is the Storage and Peripheral Products Group of Fujitsu America. And through continued expansion of

engineering, manufacturing and marketing facilities in the United States, we are dedicated to sustain our position of delivering products of unequalled quality and value.

The Group's presence in the United States market has been solidified through our commitment to quality. A commitment which begins with our employees and is carried through to product design, manufacturing and support.

Wherever you look in the Group you will see people serving your needs. Whether it's engineers developing a timely product or specially trained service representatives, their goals remain the same: to insure the product they deliver offers added value and is of the finest quality.

Our broad line of disk drives and printers all deliver added value. A value that is built-in at the concept stage and carried through to product design, selection of raw materials and components, and consistent workmanship at the assembly line. This added value and the myriad quality checks that every product must pass, translates into industry standards for reliability and product performance.

At Fujitsu we always strive to be your first choice. The one choice where you can be sure that commitments to superior product quality, added value and outstanding service help to facilitate your future growth.

Now is the time to take a look at Fujitsu. With time now right around the corner, there is no better time than today.

For more information contact Fujitsu America, Storage and Peripheral Products Group, 3055 Orchard Drive, San Jose, CA 95134, 408-946-8777.

STORAGE AND PERIPHERAL PRODUCTS GROUP

We add more Value to take You Further.



MICROCOMPUTERS

dio Shack 2000 microcomputers.

Main-11pc reportedly features generation of tables of contents, split-screen editing and list processing. It also provides for automatic pagination with widow and orphan control, the vendor said.

Main-11pc can operate with either hard disk or floppy disk-based systems under Microsoft, Inc.'s MS-DOS operating system.

The program, which costs \$995, requires at least 256K bytes of memory. Twenty-five printers can be supported, including several laser printers, the vendor said.

Microsystems Engineering, Suite 400, 2400 W. Howell Road, Hoffman Estates, IL 60135.

EXTENDED SYSTEMS

ESI-2012, ESI-2014 Sharepool

Extended Systems has announced the ESI-2012 and the ESI-2014 Sharepool products, which allow up to three personal computers to share one printer.

Sharepool products reportedly act as intelligent printer interfaces, automatically buffering and managing print output. They require one full-length option slot in one IBM Personal Computer XT.

The ESI-2014 can share a parallel-interfaced Centronics Data Computer Corp.-compatible printer with up to three personal computers, the vendor said. The ESI-2012 reportedly allows use of a serial RS-232C interfaced printer. Both the ESI-2012 and ESI-2014 are said to be equipped with 64K bytes of spooler buffer space. The ESI-2014 and the ESI-2012 are priced at \$495 each.

Extended Systems, P.O. Box 4587, Boise, Idaho 83711.

WORDTECH SYSTEMS, INC.

Db/Compiler

Wordtech Systems, Inc. has announced Db/Compiler, a compiler for Ashton-Tate's dBase II that the vendor said can be substituted for Ashton-Tate's Runtime.

Compiled applications protect source code and are portable to different hardware configurations via Db/Compiler's cross-linkers, the vendor said.

The price for Db/Compiler is \$750, and cross-environment linkers are \$360 each. However, until July 16 the vendor is offering an extra linker free with the Db/Compiler.

Wordtech Systems, P.O. Box 1747, Orinda, Calif. 94563.

CDI SYSTEMS, INC.

Tris

CDI Systems, Inc. has introduced a software package for the IBM Personal Computer and compatible microcomputers that is said to eliminate the need to rekey data when Lotus Development Corp.'s 1-2-3 is used to analyze information contained in mainframe-produced reports.

The package, called Tris, reportedly allows users automatically to transfer files from an IBM mainframe to a Personal Computer and back, to extract data while selectively duplicating key fields required for analysis and to convert the data into the format required by 1-2-3 or other spreadsheet packages.

Tris, which also operates on the IBM Personal Computer XT and the IBM 3270 Personal Computer, report-

edly produces an environment in which its modules can be executed independently.

Its data extraction module allows users interactively to select key data from the transferred file and refine the data prior to conversion to the spreadsheet format, CDI said.

Tris is available alone for \$345 or in a package with 1-2-3 for \$695.

CDI Systems, 2923 Butterfield, Oak Brook, IL 60521.

QUANTITATIVE SOFTWARE MANAGEMENT, INC.

Software Life Cycle Management

Quantitative Software Management, Inc. has introduced a program called Software Life Cycle Management (SLCM), which reportedly gives users a color graphics representation

of the various software alternatives available to them when they begin a software implementation project.

The SLM software, which runs on the IBM Personal Computer, is said to aid software managers and analysts in determining staffing needs, spending rates and risk and reliability. SLM also reportedly provides management with productivity measures for software development and allows identification of feasible solutions, minimum cost and minimum time for a software development project.

Information provided through use of SLM can aid in the planning and cost-justification of a proposed software system, the vendor said.

SLM is leased for \$30,000 per year. Quantitative Software Management, 1087 Waverly Way, McLean, Va. 22101.

MICRO FOCUS, INC.

High-Performance Level II Cobol

Micro Focus, Inc. has announced High-Performance Level II Cobol, a Cobol compiler for the IBM Personal Computer.

The compiler can assign multilevel commands to each IBM Personal Computer function key. Micro Focus said. The product reportedly supports screen attributes for color and monochrome displays, including foreground and background color selection, intensity and character blinking. Level II Cobol reportedly is compatible with Micro Focus' Personal Cobol and Animator programs.

Level II Cobol costs \$1,995. Micro Focus, Suite 235, 1000 Embury Road, Palo Alto, Calif. 94303.

DAISYWHEEL • DOT MATRIX • THERMAL

FUJITSU PRINTERS

You can't buy more performance for the Price.

Finally, there is a full line of quality printers available to meet a variety of needs. And all from a single manufacturer...

FUJITSU. From dependable dot matrix printing to advanced thermal printing, you can't buy more performance for the price.

Quality That's Built In: Fujitsu quality is built into every printer manufactured. That quality translates into high reliability (MTBF), versatile print capability, low maintenance, low noise,

and high speeds. And Fujitsu printers are serviced by TRW, a nationwide service organization. A Complete Printer Line: Fujitsu's dot matrix printer, with its 24 wire head, offers letter quality printing at 80 CPS. With its ability to also produce draft quality, correspondence quality and high resolution graphics, the Fujitsu DPL24 leads dot matrix technology.

In daisy technology, Fujitsu's SP30 is the fastest letter quality printer in the industry at 80 CPS.

Fujitsu's SP320 daisy-wheel printer also provides cost effective letter quality printing at medium speeds.

Fujitsu offers thermal printing with its TTP16 printer. The low-cost printer accepts a wide variety of papers and operates quietly at less than 50 dBA.

Call Us Today: Contact Fujitsu America, Inc., at 408-946-8777 for the printer distributor nearest you.

DISTRIBUTORS: Allpoint Computer Products (408) 946-8833, (714) 535-3420, (206) 453-2136, (914) 481-3444; Allen Edwards Associates, Inc. (212) 229-9770, (714) 552-7899, (800) 275-4771, (800) 436-5623; Four Corners Technology (802) 398-4440, (508) 421-0885; Gentry Associates, Inc. (800) 859-7450, (303) 797-7405, (812) 486-0720, (408) 794-3822, (504) 342-2975, (703) 524-8771, (800) 227-3436, (800) 772-6796, (901) 845-4072, (602) 344-0232; Hopton Associates, Inc. (215) 828-7299, (201) 273-0774, Inland Associates, Inc. (714) 764-7877, (602) 343-3123, (214) 336-0888; Logon, Inc. (201) 844-9122; Lantry Computer Products, Inc. (212) 229-7200, (214) 398-4200, (404) 457-7494, (410) 455-7694, (800) 343-9639, (412) 822-0300, (303) 541-5429; MECA Technology Corp. (301) 944-4332, (616) 422-0000; Comp Systems (619) 262-1232, (800) 899-6286, (714) 333-4000; Paul Enterprises, Inc., (An Affiliate of Optics/Control) (314) 334-3340, (404) 794-9499, (800) 247-3330, (303) 343-4577; R. Quisenberry, Inc. (800) 796-5431, (408) 426-5366; SPS Electronics, (800) 610-6300, (812) 676-0000, (203) 879-4400, (800) 343-2776; USDATA (214) 640-1500, (512) 454-3479, (714) 445-0330, (914) 422-9140.

PERIPHERAL PRODUCTS DIVISION

Quality Lives

FUJITSU



MICROCOMPUTERS

SYSTEMS

INTERNATIONAL DIGITAL ELECTRONICS ASSOCIATES, INC.

Pecman

International Digital Electronics Associates, Inc. has announced a workstation that reportedly combines communications and computing in one package.

Called Pecman, the workstation communicates at speeds up to 56K bit/sec over Western Union Corp.'s Telex, TWX and International Telex; through direct distance dialing; or over leased lines, Idea said.

Pecman also reportedly acts as a personal computer with between 64K and 576K bytes of random-access memory and floppy or hard disk storage of up to 10.2M bytes. Pecman is said to run programs such as Micropro International Corp.'s Wordstar, Sordina Corp.'s Supercalc, Ashton-Tate's Dbase II and other applications packages under Idea's own operating system.

Pecman, which uses Intel Corp. 8085 and 8088 processors, is an upgraded version of the company's Britelex unit, originally designed for communications applications. While the Britelex station combines printer and keyboard into a single unit, Pecman has a detachable keyboard and a separate printer, Idea said.

Prices for Pecman start at \$3,000. The product will be available in the fourth quarter of this year.

International Digital Electronics Associates, 6 Westchester Plaza, Elmsford, N.Y. 10523.

RAIR MICROCOMPUTER CORP.

Rair Supermicrocomputer

Rair Microcomputer Corp. has introduced Rair Supermicrocomputer, a system equipped with Intel Corp.'s IAPX 286 and IAPX 287 microprocessors, which together deliver an instruction execution rate of more than one million instructions per second and a floating-point multiply time of less than 24 msec.

Rair Supermicrocomputer accesses 1M-byte of random-access memory, according to the vendor. The product can support one or two 50M-byte hard disk drives and a 5¼-in. streaming tape drive with a transfer rate of 90K byte/sec and a storage capacity of 45M bytes, Rair said. Rair Supermicrocomputer can utilize 16 RS-232 serial ports, one IEEE 488 parallel bus and an Ethernet interface, according to the vendor.

The system runs under Digital Research, Inc.'s Concurrent DOS and the Unix V operating system.

Rair Supermicrocomputer costs \$15,500.

Rair Microcomputer, 4101 Burton Drive, Santa Clara, Calif. 95050.

STORAGE

VERMONT RESEARCH CORP.

VRC 81 PC

Vermont Research Corp. has announced VRC 81 PC, a disk subsystem for IBM Personal Computers using IBM's PC-DOS 2.0.

VRC 81 PC provides 8-in. fixed and removable disk drive storage with a formatted data capacity of 21.4M bytes, with 10.7M bytes on the

fixed disk and 10.7M bytes on a removable cartridge. Vermont Research said. The system reportedly includes the drive, a power supply, drive electronics, a controller, a cable and a host adapter.

VRC 81 PC costs \$6,420. A removable disk drive system with 10.7M bytes of storage sells for \$5,920.

Vermont Research, Precision Park, North Springfield, Va. 05150.

ACKNOWLEDGE, INC.

Tape Backup System

Acknowledge, Inc. has announced two versions of a cartridge tape storage system, one designed for the IBM Personal Computer and another that stores data produced by both IBM Personal Computers and Wang Laboratories, Inc. Professional micros.

Tape Backup System is file-oriented and permits users selectively to backup and recover data, Acknowledge said. The four-track, 8,400 bit/in. serial cartridge drive reportedly can handle 17.5M bytes of data.

The version for the IBM Personal Computer costs \$2,795. The version for the IBM Personal Computer and Wang Professional costs \$5,995.

Acknowledge, 55 Union Ave., Sudbury, Mass. 01778.

PRINTERS/PLOTTERS/PERIPHERALS

CAL-ABCO

Legend 1000

Cal-Abc Co has introduced a dot ma-

trix printer with a nine-wire print head. The print head has an average life span of three years when printing at a rate of 100 page/day, the vendor said.

The printer, Legend 1000, also reportedly offers a 9-by-11-dot matrix, logic-seeking bidirectional printing and incremental printing. It is said to have five user-selectable character sets. Legend 1000 also offers pica, elite, condensed, double-width and double-width condensed modes, according to Cal-Abc.

Legend 1000 is said to be compatible with any microcomputer using a parallel port and can be modified to operate in conjunction with a serial port as well.

Legend 1000 is priced at \$359. Cal-Abc, 14722 General St., Van Nuys, Calif. 91401.



MICROCOMPUTERS

BOARD-LEVEL DEVICES

SEATTLE COMPUTER

Ram +8

Seattle Computer has introduced Ram +8, a multifunction card for the IBM Personal Computer and Personal Computer XT.

The card includes a time-of-day clock and calendar with battery backup, a parallel printer port, a game port and 64K bytes of random-access memory (RAM), expandable to 384K bytes, Seattle Computer said.

Two Seattle Computer software programs are included on the board. Flash Disk is said to allow a portion of memory to be used as if it were a disk drive so that disk operations are speeded. Flash Print sets user-de-

fined print buffers in 1K-byte increments with a maximum of 64K bytes. The Ram +8 with 64K bytes of RAM costs \$395.

Seattle Computer, 1171 Industry Drive, Seattle, Wash. 98108.

AUXILIARY EQUIPMENT

INSTRUMENTATION AND CONTROL SYSTEMS, INC.

LifeLine Micro Ups

Instrumentation and Control Systems, Inc. (ICS) has announced LifeLine Micro Ups, a 1 kVA power supply.

The power supply provides continuous voltage regulation and line filtering and features an inverter that

supplies power during power outages, ICS said.

LifeLine Micro Ups is designed to plug into a 120 Vac wall outlet and costs \$2,500.

ICS, 530 Interstate Road, Addison, Ill. 60101.

COMMUNICATIONS

PRENTICE CORP.

Popcom Model C100

Prentice Corp. has announced the Popcom Model C100 modem card, a 1,200 bit/sec autodialing modem card for the IBM Personal Computer, Personal Computer XT, Portable Personal Computer and IBM slot-compatible machines.

The C100 reportedly uses two custom Onos integrated circuits to achieve full-duplex operation, tone sensing and voice/data control. The C100 consumes less than 1W of power, Prentice said.

The C100 is slated for availability in June at a price of \$445, the vendor said.

Prentice, 566 Cuyamaca Drive, P.O. Box 2544, Sunnyvale, Calif. 94088.

FTC COMMUNICATIONS

Message Handler

FTC Communications has announced Message Handler, a software package that allows an IBM Personal Computer or Personal Computer XT to emulate a telex or message terminal.

It reportedly provides foreground and background capabilities so the user can send and receive messages while working with a microcomputer software program. It costs \$295.

FTC Communications, 90 John St., New York, N.Y. 10038.

2001 from page 92

ments of its Attache 816T, which meets government "Tempest" data security requirements, are scheduled to begin next month.

Otrona is located at 4725 Walnut St., Boulder, Colo. 80501.

ASSIST from page 92

plates that work with Filing Assistant. Executive Solutions, selling for \$60, reportedly formats mailing lists, stock portfolios and checking accounts. Accounting Solutions, carrying an \$80 price tag, is said to include formats for payroll invoices, inventory, personnel information and general ledger. Home Solutions, available for \$60, includes tables for tracking stocks, coupons, home finances and addresses.

Each program requires 128K bytes of random-access memory and a double-sided disk drive.

All programs will be available this month, except for Planning Assistant, which will be shipped in the first quarter of 1985. Until November, current FFS-Report or FFS-File users can upgrade to Filing Assistant or Reporting Assistant for \$45, a spokesman said.

IBM is located at Old Orchard Road, Armonk, N.Y. 10604.

TERMS from page 92

like a portable television, then the machine was portable, according to Kay. As small, light, battery-operated computers were introduced, Kaypro dropped the term portable.

New discrepancies appear imminent. For example, Alpha Software Corp. says its Electric Desk, an integrated package for the IBM PC, is multitasking and supplies windows.

Multitasking, according to Alpha, allows users to suspend an operation and return to it after working with another application. In this view, multitasking does not involve concurrent processing. But concurrent is generally considered synonymous with multitasking.

Electric Desk's windowing capability consists of a screen split into two parts — not an elaborate windowing system.

THE LEASED MODEM. IT ELIMINATES THAT LOCKED-IN FEELING.

Why lock yourself in with a purchase, when you could lease and be free to up-date? That's a question a lot of people are answering by leasing their modems from General Electric.

Consider the plusses:

You get your choice of today's most advanced equipment. Quick availability from manufacturers like Racal-Vadic, General DataComm, Paradyne and Ven-Tel.

You can trade up to new equipment at any time without penalty — instead of living with hardware that time has passed by.

Your lease is backed by GE service — a one-company nationwide network that knows your equipment cold.

You get the tax-savings and other advantages of leasing — to keep your accounts happy.

Plus, you're dealing with a company you can count on. Immersed in virtually every area of telephone and data communications technology. And in business to stay.

Don't buy another modem until you've talked leasing with GE.

We've got the key to set you free.

General Electric Company, Integrated Communication Services Operation, Communication Leasing, Building 4, Room 210, Schenectady, New York 12345.

| | |
|---------------|----------------|
| Schenectady | (518) 783-6650 |
| Atlanta | (404) 452-4926 |
| Chicago | (312) 780-2994 |
| Detroit | (313) 285-6700 |
| New York City | (212) 227-7900 |
| Boston | (713) 741-9646 |
| Los Angeles | (213) 642-5317 |

GENERAL ELECTRIC

If you're not in *Computerworld's* next five special reports, look at the issues you'll miss



June 25

Graphics Systems

If you have something to offer the graphics user, this is the place to be. We'll focus on the latest technologies, techniques, and applications... emerging low-cost CAD and 3-D graphics systems; graphics terminals and software; developments in the color printer and output market; boardroom graphics; and cost-cutting, time-saving tips for top-level executives.

Closes June 9



July 2

NOC Preview Issues

A detailed roundup of the vendors and products to see at the show (complete with booth numbers). Plus we'll take a look at the special attractions in Las Vegas.

Closes June 16



July 9

NOC Show Issues

We'll highlight Data Pro's yearly hardware survey. Readers always enjoy studying other user's candid ratings of systems and vendors.

Closes June 23



July 16

NOC Wrap-up Issues

Part 2 of Data Pro's hardware survey. Also, we'll recap the major product announcements and happenings at the show.

Closes June 29



August 27

White and small business systems

We'll take a close look at the growing number of applications. Plus we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of mini and small business systems.

Closes August 10

Call the Sales Office nearest you to reserve space in any of our upcoming issues, or to get more information. Or, if you prefer, fill out the coupon and return it to: Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham MA 01701. Do it today.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales Offices

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701, (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018, (312) 827-4430; NEW YORK: Portman Plaza 1, 140 Route 17 North, Paramus NJ 07652, (201) 897-1350; ATLANTA: 1863 Pender Road, Suite D, Atlanta GA 30328, (404) 864-0758; SAN FRANCISCO: 200 Broadway, Suite 20, San Francisco CA 94102, (415) 421-7230; LOS ANGELES: 18008 Sky Park Circle, Suite 300, Irvine CA 92714, (714) 261-1220

To: Ed Marecki

National Sales Director

CW Communications, Inc.

Box 880/Framingham MA 01701

Please send me advertising information on:

☐ the Graphics Systems issue ☐ the NOC Preview issue

☐ the NOC Show issue ☐ the NOC Wrap-up issue

☐ the White and Small Business Systems issue

Please have a sales representative call me.

Name _____

Title _____

Company _____

Address _____

City _____

Telephone _____

State _____

Zip _____

COMPUTER INDUSTRY

Apple's sweet school deal sours some dealers

By David Glass
CW Staff

Apple Computer, Inc.'s program to sell its Macintosh microcomputer to 34 colleges and universities at a hefty discount may win the hearts of students, but it has soured some Apple dealers.

The Apple University Consortium program enables schools to purchase Macintoshes at about a 50% discount for sale to students and staff. The program, reportedly worth \$60 million in sales for Apple, is clearly aimed at increasing the microcomputer giant's presence in the college market.

But some computer store dealers located near consortium campuses complain that Apple's program is leaving them out in the cold by taking away a valuable market.

"The University of Michigan has no business selling retail computers," said Rick Weir, president and co-owner of the Complete Computer Center in Ann Arbor, Mich. "They are unfairly competing with the private sector."

Patricia Johnson, president of the 54-member Association of Computer Retailers (ACR), said dealers want Apple to channel sales to colleges through their stores. "Our view is that Apple needs dealers, and it needs to have a nationwide support service for its products," she said. "In short-cutting the dealers like this, they're only hurting themselves."

"I think the computer clearly hurt our relationship with some of these dealers," conceded Burt Cummings, Apple's program manager for university sales. But he



maintained that for every dealer who has complained about the program, "there are two to three dealers who are jumping to pick up the accessory market" for peripherals and software.

Cummings said the Apple Dealer Council endorsed the consortium plan as being

in the best interest of both the company and its dealers.

Ken Kosikowski, who operates Harvard Computer in Cambridge, Mass., near Harvard University, said he has no gripes with the consortium. In fact, he said, "I'm benefiting from the program." He said he has made sales to Harvard faculty and students who prefer to get the Macintosh now rather than wait until the university can supply the machines. "They're [Harvard] not offering service, they're not offering software. Students are just getting a box," he said.

One dealer with mixed feelings about the consortium is Bernie Biss, owner of Chips Computer Center, Inc., located five blocks from Dartmouth University in Hanover, N.H. Biss said his sales have not yet been hurt by the program, and he actually hopes to benefit by working out a service agreement with Dartmouth. He said his biggest concern is that Apple is confusing buyers about the Macintosh's value.

"What is the value of the Macintosh, \$2,495 or \$1,195?" he said. "That seems to be the upsetting message Apple is creating as far as I'm concerned," according to Biss.

Apple's program is an attempt to gain not only a bigger share of the university market, but also to reap the benefits of technological advances and new microcomputer software. Under the program, each university is expected to develop new software on Apple products and to share information with other consortium members.

See APPLE page 119

INDUSTRY INSIGHT/PETER BARTOLK

Raytheon drops Data Systems to tune of \$95 million

Apparently finding the best just a touch too high, Raytheon Co. disbanded its Data Systems Division, perhaps finding the commercial market a might unfriendly in comparison with "dealing with the U.S. government."

Now a company that was the second largest supplier, behind IBM, of 3270-type terminals could run its business into the ground certainly has to be one of the more puzzling developments of this confusing era.

Considering that the company had dominated the airline reservations business and had acquired Lexitron Corp., a leading vendor of stand-alone word processors, Raytheon's Data Systems on the surface appeared to have valuable name-

recognition assets.

But with the airline business satiated, except perhaps for an expensive next-generation product and with many, many competitors jumping into the terminal market these days, Raytheon apparently just didn't have the stomach anymore.

Strangest of all is that Raytheon couldn't sell off its Data Systems Division and will end up eating a \$95 million loss.

Spokesmen for the division and parent company said that parts of the division could have been sold to different parties, but that the company didn't want to go that route.

While Wall Street generally reacted

positively, I wonder what the stockholders feel about that?

Coming on the heels of its recent settlements of charges for false certification of microcircuits purchased by the military, National Semiconductor Corp. expressed great pride recently in announcing Control Data Corp. has enough confidence in National Semi quality to accept products on "a ship-to-stock basis."

To qualify for shipping CDC's incoming tests, National Semi said it had to have 100% lot acceptance for the six months preceding certification, with a minimum of 10 lots per device processed for inspection.

Senate OKs bill extending copyright protection

By John Klinehour
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Senate recently approved a bill to provide 10-year copyright protection for semiconductor designs. A substantially similar bill is now moving through the House of Representatives, raising the prospect for final approval of the legislation by the end of the year.

Passed by the Senate May 16 on a voice vote, the Semiconductor Chip Protection Act of 1984 would allow legitimate reverse engineering of chips protected under the

legislation and would provide legal immunity under certain conditions, for those who innocently infringe on chip copyrights.

The legislation, under active consideration in both houses since last summer, has generated considerable controversy. Even within the electronics industry there were those who argued copyright law is not the best or most appropriate mechanism for computer chip protection.

The bill's supporters, including its chief sponsor, Sen. Charles Mathias Jr. (R-Md.), however, argued that protection was nec-

essary and could not wait until a new or better form could be devised. The Semiconductor Industry Association agreed, claiming the legislation is "the only practical method of protecting our valuable patterns."

The House version, on the other hand, would establish a separate form of intellectual property protection for semiconductor designs.

But Mathias said he is "confident that there will be sufficient common ground between [the two bills] to make possible a

See SEMI, page 119

■ A new management team and a new line of computers are said to be the tonic needed to get Franklin Computer Corp. out of its recent malaise/182

■ A quarter of electrical engineers are not too happy with their jobs, according to a Harris poll commissioned by the IEEE/188

■ IPI Systems, Inc. and Mentor Systems Corp. both reported losses for the most recent financial quarter/181

■ The next people to "shake hands with the future" may be the citizens of the People's Republic of China, if a venture between their government and Computerland Corp. goes smoothly/184

COMPUTER INDUSTRY

CX micros, staff changes seen key to Franklin future

Alleged mismanagement makes future questionable

NEW YORK — The CX line of microcomputers introduced here earlier this month by Franklin Computer Corp., along with the shake-up in its corporate ranks, will turn the company around, according to Joel Shusterman, executive vice-president and acting president of the Pennsylvania, N.J.-based computer maker.

In remarks to reporters during the announcement of the new products here at the Hayden Planetarium, Shusterman delivered a harsh assessment of the previous management team which he said "was living in a dream world."

The CX line is a series of Apple Computer, Inc.-compatible microcomputers that weigh 25 pounds (story on page 94). Classified as transportables, they run programs written for Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 2.2 operating systems, as well as F-DOS, the Apple II-compatible operating system that Franklin developed together with independent houses Central Point Software, Inc. and Laser Software.

Borden resigns

Only 48 hours before the unveiling of the CX micros, R. Barry Borden, 44, resigned as president of the beleaguered firm. Borden himself had served only 34 days after stepping in for Avram C. Miller, who resigned under pressure as Franklin's president on April 6.

Franklin was founded three years ago as a vendor

of Apple-compatible micros with a disk operating system that was a code-for-code copy of Apple's DOS 3.3. The firm was forced to develop its own operating system software as part of the \$2.5 million out-of-court settlement of its copyright infringement lawsuit with Apple (CW, Jan. 9). Under terms of that settlement, Franklin had to stop selling boxes with the Apple-mirrored software on April 1.

"There are those who believe this company should have had its own operating system in place all along," said Edward F. Goldner, Franklin's director of marketing, newly appointed to replace Eugene H. Sherman, who was pressed to resign as marketing vice-president on May 10.

Asked if Miller, Borden and Sherman had paid the price for Franklin's mistakes in not developing a proprietary operating system, Shusterman replied, "That was an oversight on everyone's part." The three were squeezed out because they had "lost control of growth" and had "misused and misplaced" company personnel, Shusterman said.

Contacted at his home in Bala Cynwyd, Pa., Miller denied any mismanagement. "That's like blaming the Belgian Army for losing the war with Germany. The problems that company has are not the

"We should have been more cautious, given that we didn't have a big [financial] cushion. [Franklin] never had a very strong capital base and was never able to get a proper banking relationship."

— Avram C. Miller, former Franklin Computer Corp. president.

fault of any one individual," Miller said.

The former Franklin president, who joined the micro-maker in March 1983 from Digital Equipment Corp., said of his 13 months at the helm that "we should have been more cautious, given that we didn't have a big [financial] cushion." Miller said Franklin "never had a very strong capital base and was never able to get a proper banking relationship."

Borden said his resignation was a mutual decision between him and the board.

"These things are never simple," he said. He admitted he and the board had conflicts. He said he would not characterize the situation as Shusterman did. Sherman could not be reached.

Franklin enjoyed a 153.6% jump in sales to \$7.1 million in the year ended March 31, from \$28 million the year before. But when asked if the closely held vendor had turned a profit this past year, Shusterman said, "I can't answer that."

Franklin sliced its employment rolls by 14% to 460 workers in the past two weeks. "There's no question we were overstuffed," Shusterman said. "The previous management of this company was living in a dream world."

The CX micros will be handled by Franklin's league of 1,400 dealers. But dealers reacted with caution to news of their unveiling.

Franklin dealer Robert Silverman, president of the Computer Center, Inc. here, said he would agree to carry the CX line only "in a very cautious manner," adding his four stores would not stock "very heavy inventories."

Customers have shown some reluctance to buy Franklins instead of Apples, according to Silverman.

Whether the company survives "depends on this [CX] product," according to Leigh Goldstein, president of Leigh's Computers and a Franklin dealer here. But Goldstein, who said customer interest in Franklin systems had dropped, declared that unless the new micros were compatible with IBM Personal Computers "they are dead."

MicroAge

"THEY GAVE US THE COMPETITIVE EDGE!"

"Since opening our Orlando Park store in 1981, we've doubled our square footage and are opening a second store in Oak Lawn; it's MicroAge's 100th store. MicroAge showed us how to develop a professional atmosphere, build a knowledgeable sales force, and provide the technical assistance needed to reach small to mid-size businesses in the Chicago suburbs."

"MicroAge is the franchise organization you like to have supporting you because they maintain high professional standards. With MicroAge, we've gained the type of reputation that brings referrals from satisfied customers."

"If we had to do it all over again, we'd do it with MicroAge!"

Eugene H. Sherman
Eugene H. Sherman
Franklin Computer

Robert W. Silverman
Robert W. Silverman
Computer Center

To build your own professional computer sales organization with MicroAge requires an initial investment of \$200,000 to \$350,000 which includes 500,000 in liquid assets. Write to:

MicroAge
COMPUTER STORES
"The Solution Store"

1457 West Alameda • Tempe, Arizona 85282

(602) 968-3168

At last!

An inexpensive COBOL generator

SUPERCODER

Look at these built-in features: properly structured COBOL, handles all file types, automatic control report, full abort routine, audit control of processing using special headers and trailers, report generator.

All that and the source code as well. Add your own features to enforce programming standards.

Increase programmer productivity. Let them worry about the logic while SUPERCODER looks after the "house-keeping".

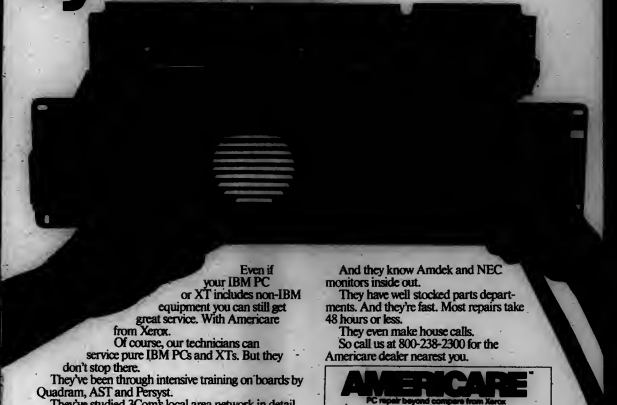
Priced from \$1,500, SUPERCODER runs on any ANS COBOL machine from mini to mainframe.

For more information write:
SUPERCODER

JOHN SWIRE & SONS (JAPAN) LTD
C.P.O. Box 703, Tokyo 100-61, Japan. Telex: 322248

XEROX

Americare introduces quality service for IBM mixed systems.



Even if
your IBM PC
or XT includes non-IBM
equipment you can still get
great service. With Americare
from Xerox.

Of course, our technicians can
service pure IBM PCs and XT's. But they
don't stop there.

They've been through intensive training on boards by
Quadram, AST and Persyst.

They've studied 3Com's local area network in detail.

They're experts on printers made by Datasouth,
Epson, Okidata and Diablo.

And they know Amdek and NEC
monitors inside out.

They have well stocked parts depart-
ments. And they're fast. Most repairs take
48 hours or less.

They even make house calls.

So call us at 800-238-2300 for the
Americare dealer nearest you.

AMERICARE™

PC repair beyond compare from Xerox

Because whatever you add to your IBM system
ought to include great service.

XEROX, Americare™ and Dealer are trademarks of XEROX CORPORATION.
IBM PC, XT, the IBM logo and IBM are registered trademarks of International Business Machines Corporation.
NEC is a registered trademark of Necor Electric Corporation.

COMPUTER INDUSTRY

EEC antitrust ruling may charge IBM with abusive

By Anne R. Saunders
Special to C&E

It is widely anticipated that, perhaps as early as June, the European Commission's (EEC) antitrust authority will, after five years of investigation, officially charge IBM with abusive practices in connection with the plug-compatible manufacturer (PCM) market.

The European Community Commission has been flexing its muscles during the last 10 years and has always sought to be known as hard-nosed when it comes to dealing with monopoly-type behavior. In the lucrative high-technology age, the Europeans, through the EEC and its commission, intend to make Europe as competitive as possible.

It is hard to see how even the commission's professional staff could resist rocking IBM's yacht, given this mix of political and economic factors. And the commission has precedent going back to 1974.

Chemical case

In the 1974 Commercial Solvents case, a U.S. chemical company refused to sell products used to manufacture a drug marketed by that company in Italy to Italian third parties. The European Court, where competition charges are appealed, ruled in favor of the shutout competitors. In this IBM matter, IBM made it difficult for competing PCMs to obtain the information necessary to stay plug-compatible. IBM and the chemical company both dominated their markets. The chemical case shows that a company with a dominant position cannot refuse to provide products to potential competitors.

A slight but important difference in the IBM case may illuminate the commission's current thinking. IBM did not refuse to disclose the information, but it did disclose it late. If the commission charges IBM with a violation, it must have concluded that in the plug-compatible market, late is equivalent to not at all. It may base its decision in part on the belief that the European non-IBM PCMs are in competitive disarray.

So if the commission wants to make an example of IBM, it can do so, and to do otherwise would give the appearance of caving in to the U.S. Justice Department, which dropped its U.S. suit against IBM and has been

urging the commission to do likewise.

Timely disclosure is the key point in more ways than one. There is speculation that the commission leaked its intentions early to pressure IBM into a negotiated settlement. The commission knows, as does IBM, that the final resolution of this case

will — if it ever comes to that — take place in the very same court that rendered the Commercial Solvents decision. The commission has reportedly turned down one previous IBM settlement offer. By leaking its intentions, the commission turns up the heat on IBM.

One significant result of

the expected charge is that the commission will, at a stroke, preserve competition in the European PCM market. The charge encourages increased participation by non-IBM European PCMs. If the commission is this bullish on the market, there is no reason for PCMs to be any less so.

Analysis of the marketing implications by PCMs should first include a plan to not aggressively to obtain contractual terms and conditions more favorable than heretofore possible. PCM manufacturers should try to obtain better terms of delivery, acceptance, credit and service as well as any other terms

The IBM Modern.
It stacks up as never before.

• Saunders is a Boston-based attorney with a practice focusing on international marketing, antitrust issues and corporate finance.

COMPUTER INDUSTRY

practices in connection with European PCM mart

that they believe put them at a competitive advantage.

Second, analysts should be conducted on whether purchasers are buying exactly what they want or are being forced to buy something in addition. Being forced to buy product X when you buy product Y may constitute illegal tying, and tying is an il-

legal in this EEC investigation.

Third, PCMs can also consider making the commission's procedures work more for them. The EEC's flexible, informal approach to anti-competitive behavior allows companies with marketing, sales and distribution agreements and plans that they believe may run afoul of the

law to be reviewed by the commission before being put into practice.

Finally, the creation of an R&D pool or a patent pool can allow the PCMs to exercise countervailing power in the market by organizing, for review by the authorities, a company that would have sole responsibility for receipt

of IBM information or for developing the much-needed technical information.

A lot to lose

IBM feels it has a lot to lose, should the charge stick. It is adamant about its right to the economic return that should accrue from its investment and does not want

partners to share the reward. To be forced to do so by the commission retards innovation and wrongfully transfers proprietary information in the form of disclosure without adequate compensation. IBM will, in the short term, make no changes to its current operations, including its well-known strategy of shipment being after announcement.

However, in the long run, IBM will have increased competition, spurred in part by the mere rumor of EEC action. This will force IBM to be more considerate about what it feels is proprietary information, more sensitive to the market and more competitive across the board with its terms and conditions.

Attempts to break Big Blue's grip on the European PCM market will encourage more competition from European manufacturers, rock IBM's host and signal both to the U.S. and Japan that Europe intends to be a force in the high-technology future. The PCM market will never be the same, and that, presumably, is the way the commission wants it.

The rack-mounted IBM 3868 Modem saves you space. And money. And effort.

Space, because IBM's one-inch-wide vertical package allows you to mount up to 12 modems in one enclosure that fits a standard 19-inch rack.

Money, because each enclosure needs only one power supply and cooling system to support all of its modems.

And you manage your network with less effort because the IBM 3868 Modem has the same high availability and rock-steady reliability as other modems in the 386X Series—plus an enhanced Link Problem Determination Aid (LPDA).

Working with software available for many IBM host systems, the LPDA performs greater end-to-end management. Now line conditions are identified further downstream from the host, and in more detail. For example, conditions in any multipoint circuit can be pinpointed to a particular leg, including tailed configurations off multiplexed links.

In fact, to help you keep your network humming, the LPDA and host software monitor and provide you with a line quality value, a receive signal level, an error-to-traffic ratio and modem self-test results to help you isolate line problems. Now you can communicate them more precisely to your communications carrier.

And because 3868 Modems are so reliable, they're backed by a full three-year warranty.

Try them for up to four weeks: just select 2400, 4800 or 9600 bps line speeds. If you purchase in quantity, discounts are available.

Ask your IBM representative for more information. For a free brochure, or to have an IBM representative contact you, call toll free 1 800 IBM-2468, Ext. 90, or return the coupon.

IBM

IBM 6-28

IBM
DIRM, Dept. 80/90
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM representative call me.
☐ Please send me more information on the IBM Modem.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

Computer Devices airs profits

NUTTING LAKE, Mass. — Computer Devices, Inc. reported that its first-quarter profits for the period ended March 31 were \$207,000, or 5 cents a share, compared with a loss of \$1.2 million, or a decline of 43 cents a share, a year earlier.

Revenues for the quarter were down sharply to \$1.7 million, compared with \$7.4 million a year ago.

The company has been operating under the protection of Chapter 11 of the Federal Bankruptcy Act since last October.

Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION
RESEARCH CORPORATION

(415) 483-4700
300 Larkspur L.C. #205
Larkspur, CA 94033
Telex 170889

COMPUTER INDUSTRY

AI to propel into \$2.8 billion range by 1990, study says

By Robert Bart
CM West Coast Bureau

SCOTTSDALE, Ariz. — The U.S. market for artificial intelligence (AI) technology is set to take off within the next two years and will reach \$2.8 billion by 1990, according to an industry study due to be out in June.

The report, titled "AI

Trends '84" from DM Data, Inc., a market research firm based here, also claimed that the emergence of AI techniques will lead to the large-scale distribution of computer capabilities and will remove the need for large DP shops in many corporations.

According to the report, the AI market will grow most

rapidly after 1986 as cost/performance ratios improve and new products such as voice-actuated word processing and voice-commanded data retrieval become viable.

The study divides the market into five areas: expert systems, natural language software, computer-aided instruction, visual recognition

and voice recognition.

"The fastest growth areas are natural language, at a compound rate of over 75%, and expert systems, at a compound rate of over 70%," the report said. According to DM Data, the number of firms manufacturing expert system software products has doubled over the last year.

"New approaches to the creation of expert systems, such as the availability of a 'case-law' framework, are expected to have a major impact on this market. Just as the software program VisiCalc [manufactured by VisiCorp] helped to create the personal computer industry, so, several new software programs have the potential of bringing AI expert system capabilities out of the university and into the hands of the business user."

"New software programs are now available which allow the unknowledgeable user to develop custom expert systems for a variety of applications at very low cost. At present, this type of program is budgeted at a \$1 million-plus range and requires several man-years of professional programmers to be marketable."

However, the report continued, natural language techniques will eventually be incorporated into most software packages and are expected to exceed 20% of the total market value of all software.

Three types of software

The report named three examples of this new type of software:

- **Advanced Reasoning Tool**, a proprietary product from Inference Corp.
- **Knowledge Engineering System**, a product manufactured by Software Architecture and Engineering, Inc.
- **Knowledge Engineering Environment**, made by Inteligenetics, Inc.

Even though these products, which run on the equivalent of a Digital Equipment Corp. VAX computer, are still relatively primitive in nature, they allow users to create their own expert software operating system in weeks instead of years. And they can already be economically applied to such areas as finance, maintenance and health services.

"As the industry becomes more experienced with this approach and the documentation improves, this do-it-yourself approach to creating expert systems will increase dramatically because of its cost-effectiveness and security aspects and is expected to constitute over 50% of the market by 1988," the report said.

In other areas of AI, the report said the market for visual and voice recognition techniques will not develop rapidly until after 1986, when new software approaches and algorithms are expected to become commercialized.

"AI Trends '84" is available for \$196 from DM Data at Suite 1000, 6900 E. Camelback Road, Scottsdale, Ariz. 85251.

You're traveling through 140 terrain
at 300 rpm.

Only one disk guarantees safe passage through the torrid zone of drive heat. Maxell.

A lifetime warranty. And manufacturing standards that make it almost unnecessary.

Consider this: Every time you take your disk for a little spin, you expose it to drive heat that can sidetrack data. Worse, take it to the point of no return. Maxell's unique jacket construction defies heat of 140°F. And keeps your information on track.

And Maxell runs clean. A unique process impregnates lubricants throughout the oxide layer. Extending media and head life. How good is Gold?

Maxell's the disk that many drive manufacturers trust to put new equipment through its paces. It's that bug-free.

So you can drive a bargain. But in accelerated tests, Maxell floppies lead the industry in error-free performance and durability. Proving that if you can't stand the heat you don't stand a chance.

maxell.
IT'S WORTH IT.

Maxell Corporation of America, 40 Oxford Drive, Minneapolis, M.J. 55409 201-440-8000

The Philips Systems. Future Included.

The Strategy. Every piece of Office Automation equipment from Philips Information Systems includes the future. Our strategy incorporates hardware and software solutions for everything from standalone word processors to sophisticated local area networks and beyond. It's a strategy that assures you the decisions you make today will be right for tomorrow.

What's Included. Start with the 3000 Series. It supports a variety of word processing, personal computing, mass storage and communications capabilities. For additional capacity, add the 1002, our low-cost standalone and distributed keyboard-entry unit with communications.

And now there's the Philips 3000 Personal Computer, a professional workstation with an IBM®-compatible MS-DOS™ operating system. For more varied communications, there's IMF, our distribution system for electronic mail and on-line access.

What's Coming. You'll soon be able to incorporate IPS, a 32-bit UNIX™-based supermicrocomputer into your Office Automation strategy.

When your office needs document management and control in a central environment, COMIS software for your IBM or IBM-compatible mainframe will be the answer. And, for record storage problems, consider Megadoc. Using our new digital optical recording technology, you'll store millions of documents in an area smaller than a filing cabinet. And access a document simultaneously from different offices in seconds.

Our Resources. Our parent, N.V. Philips, a 16-billion-dollar multinational corporation, is the third largest corporation specializing in communications and electronics, with 200 factories in over 100 countries and 300,000 employees worldwide.

To find out more about the Philips Systems, call toll free 1-800-828-6211. In New York State 1-800-462-6432. Or, send the coupon.



Helping you solve the mysteries
of Office Automation.

**PHILIPS
INFORMATION
SYSTEMS
PHILIPS**

Alexander Pickwick
- The World's Foremost Office
Automation Problem Solver.



* MS-DOS is a trademark of Microsoft Corporation. UNIX is a trademark of Bell Laboratories. IBM is a registered trademark of International Business Machines Corporation.

Yes Philips! I want to make your systems a vital part of my
Office Automation future.

Please send me further information on your Office Automation strategy.

Name

Title

Company

Address

City

State

Zip

Mail to: Philips Information Systems, Inc., Marketing Services,
4040 McEwen, Dallas, TX 75234

CW 5/82

COMPUTER INDUSTRY

IBM seen magnifying its business graphics efforts

By Jeffery Bessler
CW West Coast Bureau

ANAHEIM, Calif. — IBM, during the coming months and years, will greatly intensify its efforts to meet the graphics needs of corporate MIS managers, according to Jeff Anderson, marketing director at the graphics software firm of Inco, Inc.

For years, Big Blue followed developments in the business graphics field mainly as a spectator. The result was that information systems managers were often forced to turn to "the non-IBM world to obtain the graphics tools their end users are increasingly demanding," Anderson said last

week at the fifth annual conference of the National Computer Graphics Association (NOGA).

But during just the last year or so, the industry giant has clearly begun to rethink its old attitudes toward business graphics and has plunged into the fast-growing field with a vengeance,

he said.

IBM's expanded activities as a business graphics vendor are reflected in the company's product line, which has grown recently to include the Model 4150 graphics copier and the Model 5500 color video terminal. Both units were on display last week in the firm's exhibit on

the NOGA conference floor.

Even the IBM booth's location symbolizes the vendor's newly awakened interest in the business graphics sector, Anderson said. Strategically situated not more than 20 feet from the exhibit area's main entrance, the Big Blue product display ranked among the NOGA exposition's most conspicuous sights.

For Anderson, Big Blue's heightened presence at this year's NOGA gathering foreshadows a continued growth in the firm's graphics-related activities. In the near future, the industry giant's main mission in the business graphics arena will be to introduce products that provide significantly better features and functionality than the offerings the company sells today.

In particular, Anderson expects IBM to improve the quality of its terminals substantially, both in their resolution and the extent of the color selection.

Current limitations in the IBM Personal Computer's output quality have made the micro unsatisfactory as a graphics tool for many end users, who have frequently opted instead for non-IBM alternatives.

But in the future, the firm will almost certainly remedy the limitations in its graphics capabilities and thus satisfy user demands for increased resolution, Anderson said.

THE HARD FACTS ABOUT PAYROLL/PERSONNEL SOFTWARE.



In head-to-head competition, software buyers select the ISI Payroll/Personnel System 90% of the time.

Once you have the facts, decision-making is easy. And it's a fact that when ISI competes against other systems, ISI consistently wins out. It just takes a demonstration of ISI software. We're the industry's Payroll/Personnel specialists. And clients recognize the best.

Clients like Ford Motor Company, Harvard University, Phillips Petroleum, Bank of Montreal, First Interstate Bancorp, Hartford Insurance Group, and the State of Colorado, to name a few.

We're miles ahead of the competition in system architecture and system documentation. We offer more real-time, on-line expertise than any other vendor. And we're committed to customer service. We're always ready to be on-site to help with any aspect of your installation. And that includes fixed-price customization.

ISI software is versatile, too. It's designed to run on all IBM mainframes, the IBM System/38 and Prime. ISI supports data base and data communications environments including IMS, ADABAS, DATACOM, IDMS, VSAM and CICS, IMS DC, ADS/on-Line, NATURAL and IDEAL.

Call us. We'll answer your questions with the kind of straight talk and hard information it takes to make informed decisions. We think you'll see why Datamation Magazine ranks ISI number one in payroll/personnel software.

Setting the standards for excellence.

ISI INTEGRAL SYSTEMS INC.

165 Lennon Lane, Walnut Creek, California 94598
In the U.S. call toll-free 800-824-8199, in California 800-824-8198,
locally and in Canada (415) 959-3900.

Sales and support offices located throughout North America.

QIC proposes ¼-in. format

SAN DIEGO — The working group for Quarter-Inch Cartridge Drive Compatibility (QIC) is proposing as a worldwide standard a 120M-byte class of ¼-in. cartridge tape drives utilizing error correction code.

The QIC will present its recording format proposal, called QIC-60, at the group's meeting June 13-14 in Oslo, Norway.

"The QIC-60 format will provide read compatibility with current 4-track and 8-track cartridges which utilize the QIC-24 recording format," said Raymond C. Freeman Jr., QIC facilitator and president of Freeman Associates, a Santa Barbara, Calif., consulting firm specializing in data storage markets and products.

QIC, a computer industry group, was established to spur widespread use of ¼-in. cartridge tape drives through the development of proposed standards that will encourage industry-wide compatibility.

"The worst thing in the world is to look dumb when someone in your company asks you about a computer related product..."



"... Computerworld puts you in touch with the experts and gives you up-to-the-minute exposure to the information you need to stay ahead."

That's what John Groppe—senior appointed director of MIS for the Stapan Company—told us when we asked him, "Why read Computerworld?" He's one of 25,000 paid subscribers who think that Computerworld is too important to his work to rely on someone else's copy.

Each issue of Computerworld brings you:

- **News.** You get absolutely up-to-the minute coverage on everything that affects you in the computer field.
- **Technical Information.** You'll find special sections on Software & Services, Communications, Systems & Peripherals, and Microcomputers. You'll read about the latest news and product information, user reports, and applications.
- **Editorial.** You'll gain opinions and insights from our editors, special columnists, and readers about topics of concern to you.
- **In Depth Features.** Several articles in each issue feature guest contributors who have expertise in a wide range of areas.
- **Computer Industry Updates.** You'll hear the latest about the business of computers: the comings and goings of top executives... who's making deals... and who's making money!
- **Classified Advertising.** If it's available you'll see it advertised first in Computerworld! And, we

devote our back section to position announcements, business opportunities, and a "bulletin board" for buying or selling used equipment.

Why should you subscribe to Computerworld?

- ☐ **It saves you time.** Headlines provide a capsule of the article so that you can get a quick overview of the week's news and announcements... and come back to those articles of immediate concern.
- ☐ **It gives you a resource to return to.** Issue by issue Computerworld becomes a valuable addition to any business library—and the special issues become important references.
- ☐ **You keep up with new products.** Read a magazine for the ads! Absolutely! Software and computer vendors place ads first in Computerworld... so you can get a fast look at what's available.

Who should read Computerworld?

Anyone in the computer world:

For the senior executive...

Computerworld keeps you on top with the latest breaking news.

For the mid-level executive...

Computerworld arms you with the facts you need to remain competitive on a day-to-day basis.

For the person just starting out in the computer business...

Computerworld provides an ongoing foundation of knowledge to help you move forward in your career.

For the non-computer executive...

Computerworld gives you the "most know" information in plain English and helps you with important management decisions.

Here's what you get with your subscription:

- You get 51 issues of Computerworld, the most vital newsworthy in the computer world today.
- You get special issues of Computerworld On Communications, which focus your attention on this fast growing area of computers today.

• You get 6 issues of Computerworld QA, which provide a full range of information about office automation, from proven training methods to applications software.

• You get 5 Buyer's Guides, which provide the details and contacts you need on every conceivable product... from micros to mainframes.

And that's more than 12,000 pages filled with vital facts, important news, and invaluable reference material.

Order by phone... and save \$5.00!

For faster service—and a special discount—dial our toll-free number today. You'll pay only \$28.00 for one full year of Computerworld—that's \$0.60 off our regular subscription price. Or, if you prefer, complete the order form you'll find bound into this issue.

1-800-343-5730
(In Massachusetts, call collect 617-873-0708.)

Get off the routing slip!
Subscribe today.

THE COMPUTERWORLD GUARANTEE

If for any reason Computerworld does not live up to your expectations, simply notify us and we will refund the entire unused portion of your subscription price. No questions asked.

WHO DOES WHAT WHERE IN THE WORLD?

New Handbook of International Public Data Networks
has the answers for over 60 countries on 6 continents.

Published with data on Packet Network services, arranged by country:

- International Networks • Rates • Regulatory Authorities • Contracts
 - Access Methods • Protocols and Speeds • Privacy Protection Laws
 - International Carriers and much, much more
- Seven hours of research time. Invaluable for project and network planners and managers.

GUARANTY RESOURCES LTD.

625 Walnut Street, Suite 301, San Carlos, CA 94070 415-954-1261

Please send _____ copies at \$36 each (includes shipping and tax)

Total \$ _____ ☐ Payment enclosed ☐ Bill me

Name _____ Firm _____
Address _____
City/State/Zip _____

Job dissatisfaction scores high in IEEE-backed survey

BOSTON — Roughly one-quarter of the nearly 2,000 electrical engineers responding to a recent survey said they were dissatisfied with their jobs, and, the survey noted, the problem is greatest with those engineers under the age of 30 earning below \$35,000.

The survey, conducted by Louis Harris and Associates for the 250,000-member Institute of Electrical and Electronics Engineers (IEEE), also reported that the engineers' level of job dissatisfaction was nearly twice that of doctors and five times

that of lawyers, two professional groups that responded to similar recent surveys.

According to the IEEE survey, 27% of all respondents felt "their career has fallen short of what they had hoped for." An equal percentage felt their careers had exceeded their expectations, and 36% felt their careers have been what they had expected.

Human element needs higher

When asked what could improve their level of job satisfaction, the respondents listed human factors rather than increases in benefits and pay. The keys to job satisfaction, they said, were creative opportunities, a good working relationship with managers, growth potential and having a good working rapport with peers.

The keys to productivity, they said, were more and better information from management about decisions that affect engineers, giving engineers more say in decisions that affect them and providing a greater chance for recognition and promotion.

Survey results, released last week at the IEEE's international conference here, noted that the respondents were "somewhat critical of nearly all their fellow workers in terms of how many hours they put in, how effective they are and also how creative they are." Management was also scored by most respondents as "less productive and less creative than any other component in the work force."

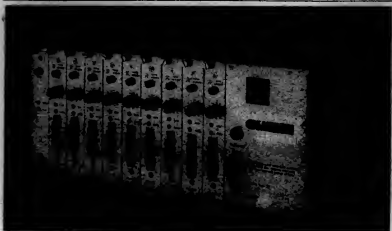
The respondents who said they were dissatisfied complained most about having to do too much routine paperwork (61%) and not having enough time to attend external meetings and conferences (55%). They rated opportunities for creativity as being among the most important keys to job satisfaction (58%) and said they felt most other electrical engineers they know are just as dissatisfied (53%).

The survey, conducted in part with funding from the National Science Foundation, also found that 70% of the respondents felt that U.S. productivity was either fair (60%) or poor (12%), and that of 10 social issues, their greatest (94%) concern was "the nation's competitive position in world markets." Also rated as high concerns were national politics, technology matters (86%) and the nuclear arms race (86%).

Those who felt most strongly that the U.S. was competitively weak laid the blame on labor unions, but nearly one-third said it was the fault of their manager. Ten percent, meanwhile, said it was the fault of engineers themselves.

"What these data strongly suggest," the report said, "is that productivity must be improved at the company level, rather than mandated at the national level."

"What we can conclude from a review of these profiles," the report noted, "is that the satisfied electrical engineers work in an environment where supervisors act as good examples for productivity, where creative opportunities and autonomy are evident, where, in short, good employee relations practices are in force."



**\$8295
converted to
\$3768**

**Still the most reliable protocol converter.
Now the best priced protocol converter.**

The Kaufman 87X. For support of eight ASCII devices, that's only \$471 a line. That makes the 87X the most cost-effective converter on the market. And it's also available with four or six ports.

You'll also find the 87X easy to upgrade with its modular design. Plus, it's compatible with IBM Bsync or SNA, and Sperry Univac.

Find out more about the Kaufman 87X. Call or write Marketing Department, Kaufman Data Communications, Inc. 415/962-8811

KAUFMAN
DATA COMMUNICATIONS, INC.

An Orange County Electronics Company

415 East Dana Street
Mountain View, CA 94041-1573
415/962-8811 FAX: 910/379-5021

COMPUTER INDUSTRY

IPL reports revenue dip of 67% plus

WALTHAM, Mass. — IPL Systems, Inc. recently reported a first-quarter loss of \$2.7 million, or 54 cents per share, as revenues slipped by more than 67% from the comparable quarter one year ago.

The company said the decline in revenue was due to a realignment of its sales and marketing organization and technical problems that delayed the availability of its model 4480 Continuous Compatible Computer dual processor.

The company also said it has solved those technical problems and began shipping the 4480 during the second quarter.

The losses posted in the first quarter represented a dramatic 360% downward jump from the loss of \$580,000, or 5 cents per share, posted a year earlier. IPL reported revenues of only \$682,000 for the first quarter, in comparison with \$2.80 million one year ago.

The company said the realignment of the sales and marketing groups and the use of a third-party maintenance organization are expected to strengthen its sales efforts.

HP profits up 30% for quarter

PALO ALTO, Calif. — Hewlett-Packard Co. reported that earnings for the second fiscal quarter, ended April 30, rose 30% to \$141 million, or 66 cents per share, compared with \$109 million, or 45 cents a share, in the same period last year.

Revenues also rose by 30% to \$1.5 billion for the period, compared with \$1.1 billion a year ago.

Incoming orders in the second quarter amounted to \$1.6 billion, a 30% increase over \$1.2 billion a year earlier. Domestic orders were \$653 million, a 35% rise from a year ago, while international orders gained 25% to reach \$656 million, HP said.

All four of HP's business segments showed an increase in order: computer products (27%); electronic test and measurement (36%); medical electronic equipment (18%); and analytical instrumentation (19%).

HP said its second-quarter expenses, which rose to \$200 million from \$180 million a year ago, reflected an emphasis on microcomputer items.

Masstor reports losses despite strong sales

SANTA CLARA, Calif. — Masstor Systems Corp. recently reported that first-quarter sales had almost doubled compared with year-earlier results, but that expenses had more than doubled over the same period and so had the company's losses.

The company reported

first-quarter revenues of \$4.3 million, compared to \$3.3 million one year ago. Total expenses, however, soared to \$11.6 million from the \$5.5 million reported in the first quarter of 1983. As a result, the company reported a loss of \$6.3 million, or 37 cents per share, for the quarter ended April 1, compared

to a loss of \$1.5 million, or 23 cents per share, a year earlier.

Bert Salts, chairman and president, hinted at better days ahead, pointing out that product development "will be at a substantially reduced rate in subsequent quarters, due to completion of several projects in the first quarter.

Research and development costs in the first quarter were \$2.7 million, double the level of R&D spending one year ago.

Salts also noted that first-quarter orders from six domestic customers, and a letter of intent from one other, match the total of customers added in all of fiscal 1983.

The Circulation Dept., CW Communications/Inc.,
Box 800, Framingham, MA 01701

☐ Please enter my one-year subscription to the publication(s) I have checked. (If you wish only to get further information on a publication, just circle the name.)

☐ Computerworld — #44* ☐ InfoWorld — #51*
☐ PC World — #24* ☐ Micro Marketworld*
☐ My check is enclosed ☐ Charge to my credit card ☐ MC ☐ Visa
☐ Amer. Exp. date _____ (MC only)

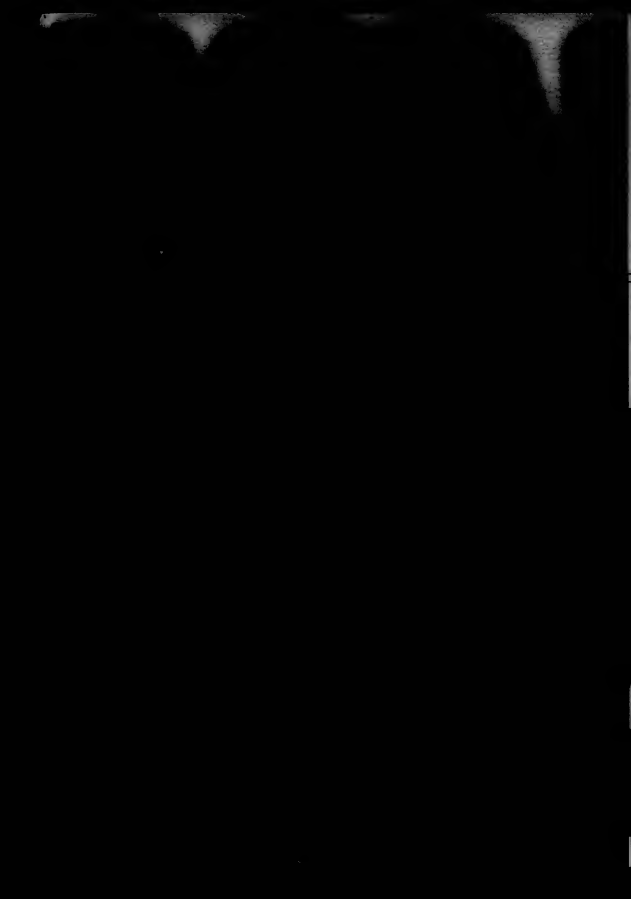
Address _____

City _____

State _____

Zip _____

Signature _____





COMPUTER INDUSTRY

Computerland China planned

OAKLAND, Calif. — The next people to "shake hands with the future" may very well be the Chinese.

Computerland Corp. recently announced that William H. Millard, company founder and chairman, signed a letter of intent with officials of the People's Republic of China's Ministry

for the Electronics Industry to create a joint venture called Computerland China.

With final details to be worked out during the remainder of the year, the project may be initiated as early as June, with a Beijing exhibit in microcomputer products from a broad range of manufacturers, according to Com-

puterland.

Millard said the company has received U.S. approval to ship a broad selection of products to Beijing for the exhibit this summer. The company will also submit for U.S. government approval a plan to train Chinese technicians who would then train Chinese users.

Packard lauds engineers' contribution to future

By Edward Warner
Civ Staff

BOSTON — The next 100 years will see men stationed on the moon and will produce a world of computer chips made by genetically engineered organisms, David Packard told a banquet last

week celebrating the 100th birthday of the Institute of Electrical and Electronics Engineers (IEEE).

That future world, the chief executive officer of Hewlett-Packard Co. told the gathering of about 500 IEEE members, will

Packard

become a reality in part because of the efforts of electrical engineers. Remarking on the advances of the past century, Packard said: "I cannot help but be very optimistic about the next century for electrical and electronic engineering."

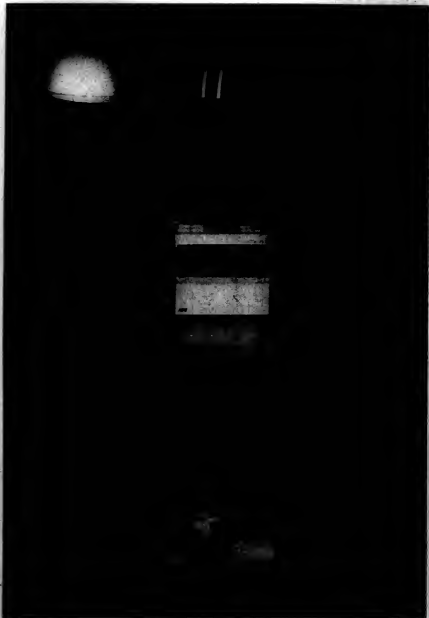
Turning to the present, Packard called "simply stupid" a recent U.S. Department of Defense proposal to censor the reports from academic research projects that it funds. Packard said the proposal, now under consideration by a Defense Department committee, "will do considerable damage to the advancement of all technology in the [U.S.], including technology useful for military purposes." The plan also would fail to meet its goal of summing the flow of U.S. technological knowledge to the Soviets.

Packard criticized the breakup of AT&T as a great mistake and predicted it will result in "much worse telephone service and higher rates."

Among those in the audience were the chairmen of the boards of AT&T and Texas Instruments, Inc.

An electrical engineer himself, Packard, 73, and Stanford University classmate William R. Hewlett formed their electronics firm in January 1939. Before that, Packard had worked as an engineer with General Electric Co., where he said he had been advised to specialize in designing power generation equipment and to stay away from electronics.

Packard lauded the luminaries of electrical engineering's last century, including George Westinghouse, who first harnessed the hydroelectric power of Niagara Falls, and Cyrus Elwell, a fellow Stanford graduate who developed "the first device that made wireless telephoning possible." He also praised the numerous joint development projects of venture capitalists and inventors, Elwell's work among them. He noted that "despite the criticism we hear, the [U.S.] has somehow provided a more favorable environment for innovation and invention than any other country in the field of electrical and electronic innovation."



Service for Your IBM PC and Mixed Peripherals.

Get Back-Up™

It's no use having a service program if it can't meet all your needs. But finding a specialist for your IBM PCs who will also be able to handle your compatible peripherals has been tough. After all, IBM only maintains its own machines and the "generalists" try to be everything to everybody. There has simply been a gap in the IBM PC service business. Until now.

Back-Up, The Flexible Specialist

Now you've got Back-Up service from Control Data. We're *specialists* in servicing the IBM PC. In fact, we're the oldest national maintenance organization servicing IBM computers, outside of IBM. But, we're also *flexible* enough to be able to service your compatible

peripherals. So, the gap in the service industry has just been filled—with Back-Up service.

Our Unique Service Options

Because different companies have different needs, you can design a program that will fit your specific needs. You may contract for full fixed fee coverage or for our flexible fee option that lets you pay a very low annual fee for service with additional charges for equipment exchanges only as you need them. Or, you can use us on a per-call basis. Best of all, you can arrange to have different levels of coverage

on different pieces, so ultimately, you end up with the most efficient, cost effective program you can find. We're also nationwide, so your other offices have Back-Up coverage too.

**1(800) 346-6789
Will Get You Back-Up**

Call us for more information. If you're in Minnesota, call (612) 292-2209. No one should be without Back-Up. That's what we are. It's what we give you. And that's what you'll be. From the High Touch Professionals at Control Data.


**CONTROL
DATA**



IBM PC and IBM are registered trademarks of International Business Machines Corporation.

COMPUTER INDUSTRY



Lichtenburg

Space: a better medium for silicon?

Shuttle experiments may yield bigger, purer silicon crystals

BOSTON — An MIT scientist who spent 11 days in space last year told a gathering of members of the Institute of Electrical and Electronics Engineers here last week of growing a high-quality silicon crystal aboard the space shuttle.

Dr. Byron K. Lichtenburg, one of the two scientists aboard the shuttle's SpaceLab 1 research laboratory, said the rod-shaped silicon crystal was produced to determine whether a higher level of silicon purity could be achieved in space than is possible on Earth.

Lichtenburg also predicted that

the weightlessness of space might permit much larger gallium-arsenide crystals to be grown than is possible on Earth, a potential boon to the production of what some say is the microprocessor chip-making material of the future.

The results of experiments conducted aboard the \$1 billion SpaceLab will be released sometime in June, Lichtenburg said.

In all, two trillion bits of scientific data were transmitted back from the mission, he said.

To gain the vacuum needed to grow crystals, he noted, the space

scientists linked a tube from the crystal-growing chamber through the walls of their orbiting lab to the vacuum of space.

Data from SpaceLab's experiments was given preliminary study on an off-the-shelf Apple Computer, Inc. personal computer augmented by an Odetics, Inc. data recorder, he said.

Asked what it felt like to take off in the shuttle, Lichtenburg, who will fly another shuttle mission in June 1985, replied: "If you can imagine being on a freight train trying to go at the speed of sound, that's about what it feels like."

Advertising

The one-stop, international advertising service for micro marketers.



you'll reach microcomputer buyers all over the world with Computerworld's International Marketing Services (CWIIMS). Because we have the microcomputer market covered with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of Computerworld's International Marketing Services, you can advertise in 15 magazines devoted exclusively to supplying information to microcomputer users in: Australia (MicroWorld, PC World), Brazil (Micro Mundo), Denmark (Micro Verden),

Finland (Mikro), France (Golder, PC World), Japan (PeraCom World), Norway (Mikro Data), Sweden (Mikro Data), Miss Hemelstov), Spain (Micro Sistemas), The Netherlands (Micro Info), West Germany (Micro Computerwelt, PC Welt). And, your advertising



message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications

will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.



Diana La Muraglia, General Manager
International Marketing Services
CWI Communications Inc.
275 Cockburn Road, Box 180
Framingham, MA 01701

Please send me information on:

☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Software AG names president

RESTON, Va. — Software AG Systems, Inc. recently announced that Stuart J. Miller was elected president and chief executive officer of the company and of its operating subsidiary, Software AG of North America, Inc.

John Norris Maguire, chairman of the board and currently president, will continue as chairman, the company said.

Miller, 44, is presently vice-president, Office Information Systems, with Sperry Corp.'s Computer Systems Division in Blue Bell, Pa.

Two firms ink source contract

SUNNYVALE, Calif. — Signetics Corp. and Motorola Corp. recently announced an alternate-source agreement involving three Signetics VME bus modules and Motorola's MC68010 16/32-bit microprocessor.

Mike Hackworth, Signetics vice-president of the MOS/Linear LSI products group, said the agreement is part of a continuing program of cooperation announced in March 1981, when both companies worked out a program for codevelopment of Motorola's 68000 family of microprocessors and peripheral chips.

Under the terms of the latest agreement, Motorola will alternate-source Signetics SMVME20XX, a single-board computer with the 68010 microprocessor and 68461 memory management unit; the SMVME1600 system controller board; and the SMVME4500 intelligent multiple-disk controller board. Signetics will alternate-source the MC68010 microprocessor, which features a 32-bit internal architecture.

Motorola said it projects supplies of the Signetics board designs will be available in June, while Signetics said it will have samples of the Motorola-designed microprocessor available in the fourth quarter of this year.

The two companies said they anticipate future announcements as further alternate-source agreements are ratified.

COMPUTER INDUSTRY

FORECASTS
AND FINANCE

Micro-software start strong

NEW YORK — The microcomputer software market in the U.S. will grow from \$1.86 billion in 1983 to approximately \$12 billion by 1990 in constant 1983 dollars, according to "Microcomputer Software Distribution."

The 180-page report from Find/SVP, an information and research firm based here, says the key to this explosive growth will be the evolving distribution strategies in the business, education and home markets.

The study forecasts a shakeout in the general application business and home markets. The report, which focuses on evolving distribution patterns and strategies for micro software, is available for \$985 from Find/SVP, 500 Fifth Ave., New York, N.Y. 10110.

Federal DP selection criteria

WASHINGTON, D.C. — A report from International Data Corp. details the policies and practices used by U.S. government agencies in the selection of data processing systems.

The report, "Technical Evaluation vs. Cost in the Selection Process," concludes that these policies are often misunderstood and inconsistently applied, resulting in numerous protests.

The report is available for \$495 from International Data, Suite 340,

1500 Planning Research Drive,
McLean, Va. 22102.

ment, 28A Park St. Station, Medfield,
Mass. 02052.

source Development, 6 Prowitt St.,
Norwalk, Conn. 06855.

Phone/display units popular

MEDFIELD, Mass. — The U.S. market for integrated telephone/display terminals began to take off in 1983, with shipments of more than 32,000 units valued at more than \$43 million, according to a recent report by Advanced Resources Development, Inc.

The study found that the bulk of the market consists of low-end, non-intelligent terminals such as Northern Telecom, Inc.'s Displayphone, Tymshare, Inc.'s Scanlet XL and GTE Corp.'s Actiocation.

The study is available for \$700 from Advanced Resources Develop-

Color printer sales to rise

NORWALK, Conn. — The recent widespread adoption of color monitors and color-capable software will drive color printer sales to \$4.1 billion in 1989, up from \$750 million in 1984, according to a study titled "Color Printers."

The 180-page report from International Resource Development, Inc., a market research firm here, says that an annual growth rate of 18% will be prompted primarily by sales of pen plotters in the scientific/engineering and business communities.

The study costs \$1,650 and is available from International Re-

DEC, AT&T, IBM compared

BOSTON — A report compares three different software environments from Digital Equipment Corp., AT&T and IBM in terms of computing power, compatibility with hardware, program development capabilities and network support.

Prepared by the publisher of the industry newsletter, "Monocase on DEC," the report details three operating systems: DEC's VAX/VMS, IBM's VM/CMS and Unix.

The report is available for \$180 from Monocase Technology Enterprises, P.O. Box 71, Kenmore Station, Boston, Mass. 02215.

dump the dumb

Replace your
dumb terminals
with smart PC's!



Centronics Data Computer Corp. announced revenues for the first quarter were \$39.5 million, compared with \$43.7 million a year ago. Net loss for the quarter was \$1.9 million, or 17 cents per share, compared with a profit of \$204,000, or 2 cents per share, one year ago.

Linear Instruments Corp. reported profits for the quarter ended March 31 were \$46,036, or .014 cents per share, compared with a net loss of \$41,266, or 1 cent per share, one year earlier. Revenues were \$1.09 million, compared with \$1.01 million one year ago.

Fibronics International, Inc. announced per-share profits for the first quarter ended March 31 of 6 cents, compared with a loss of 1 cent per share one year earlier. Revenues were \$2.3 million, compared with \$913,157 for the same period in 1983.

Data Card Corp. reported profits for the fourth quarter ended March 31 were \$2.1 million, or 34 cents per share, compared with \$1.8 million, or 29 cents per share, one year ago. Revenues were \$24.2 million, compared with \$17.8 million for the same period last year. For the fiscal year ended March 31, Data Card said, profits increased 37% to \$6.1 million, or 96 cents per share, compared with \$4.5 million, or 73 cents per share, one year ago.

Consider this: At either end of the communications chain, there is a need for a smart PC to manage the data flow. The modern management tool, often do everything that the dumb terminal can... and much more. Your PC or XT can receive mainframe data as easily as an IBM 6881 or 3278 terminal when you add a Blue Lynx emulation package. If you've already got a dumb terminal, dump it and get the powerful abilities of a Blue Lynx equipped PC. For the same price as a terminal, or less, you can join the 6,000 plus people who use their PCs both to talk to mainframes and to run office applications.

Blue Lynx synchronous emulation packages make a PC respond to an IBM host computer as an actual terminal. Available for IBM 3204 and 4204 mainframes (SOLC or binary) or the IBM 5/34, 5/36 and 5/38, Blue Lynx also offers you:

- Printer support. Makes your PC printer appear to the host system as a 3270 or 5256.
- Bidirectional file transfer capability.
- Full ASCII/ESDIOC translation. No need for a protocol converter — Blue Lynx does it all.
- Just plug the Blue Lynx synchronous communications board into any expansion slot of your PC (its a snap), load the software and you're ready to go.
- Blue Lynx 3278 Emulation. IBM/ASCL or binary.
- Blue Lynx 3271/13 Emulation for 5/34, 5/36 and 5/38.
- Either Blue Lynx hardware/software package — \$990.
- Combination of two emulators — \$1220.
- ETU — Emulator Transfer Utility allows either upload or download of files between a PC and a 5/34, 5/36 or 5/38 — \$500 or \$600.
- Multi-Line Port Expander — Gives you 4 communications ports where you just have one — \$1380.
- VTEBII — Asynchronous communications and DEC VT-100 emulation — \$125.

OVER
6,000 BLUE LYNX
INSTALLATIONS

Make the micro-to-mainframe connection

(212) 684-7788

Telex 987134



TECHLAND
SYSTEMS INC.

25 Waterside Plaza, New York, N.Y. 10090



Blue Lynx 3278 is a joint development
of Software Systems, Inc.
and Techland Systems Inc.

COMPUTER INDUSTRY



MERGERS AND ACQUISITIONS

The International Bureau of Software Test, Quincyville, Calif., announced the acquisition of Peripheral Vision Laboratories, Inc., Marlboro, Mass. Under the agreement, the California and Massachusetts laboratories will provide complete software testing services. Terms of the sale were not available.

The Dun & Bradstreet Corp., New York, announced it has reached an agreement with the board of directors of Datastream PLC, London, on terms of an offer through a Dun & Bradstreet subsidiary to acquire Datastream. Dun & Bradstreet will offer \$3.5 per share, or about \$101 million, for 100% of Datastream's approximately 13.3 million shares of common stock outstanding. The offer will also be applicable to approximately 190,000 shares that may be issued upon exercise of stock options. Datastream shareholders have agreed to sell their shares to a UK subsidiary of Dun & Bradstreet.

Amalgam Devices, Inc. (ADI), Norwood, Mass., announced that its Analog Devices Enterprises Division has increased by \$4.5 million its investment in International Imaging Systems, Inc., Milpitas, Calif., by purchasing common stock from a group of its shareholders. According to International Imaging Systems, this

greater involvement by ADI will strengthen International Imaging Systems' ability to continue its product and market development efforts and help it keep pace with the growing market for image processing and image understanding.

Constar Computer Corp., Dallas, has been purchased from Electronic Data Systems Corp. by a group that includes Constar's original owner, Centurion, Inc. Terms of the sale were not available.

Casa Grande Mining Co., Calabasas, Calif., announced a merger agreement with Datafusion Corp. The merger is scheduled to close on May 30, subject to the shareholders' approval and to proxy material being submitted to the Securities & Exchange Commission.

Arrays, Inc., Los Angeles, announced a letter of intent with American Micro Products, Inc., Richardson, Texas, for the acquisition of all capital stock of American Micro Products. The proposed acquisition calls for Arrays to issue shares of its common stock, not to exceed 176,000 shares, having a market value at the closing of approximately \$1 million. The acquisition is subject to certain conditions, including the execution of a definitive agreement.

Veritas Associates, Inc., Palo Alto, Calif., announced it has acquired the assets of Gavook Systems, Inc., Sunnyvale, Calif., for an undisclosed amount of cash.



SUPERCOMPUTERS

In a joint venture between Talgram Technologies Corp. and Micro Ware, a Canadian firm, Talgram Technologies Canada has been formed as the exclusive distributor of Talgram products. Also, Talgram Technologies has signed distribution contracts with Norsk Marcon A.S. in Norway, Oveit A.B. in Sweden and Data-Helsinki in Finland. The contract calls for each company to distribute Talgram products.

M/A-Com, Inc. announced that one of its operating companies, M/A-Com Linhabit, has received a \$20 million contract from Schlumberger Technology Corp. to provide the pilot and initial production phases of the Schlumberger Satellite Network.

John A. Venator has been named executive director of the 47,000-member Data Processing Management Association by the group's executive council. Venator had served as acting executive director since September 1983.

Sydia, Inc. signed a purchase agreement with GTE Business Communication Systems, Inc. for Sydia's Voicestation system and follow-on

products, which will be marketed under the name Omni-Action Office System. The system will be in conjunction with GTE's Omni family of private branch exchanges as well as in add-on applications to customers' current communications systems. This contract spans three years and has a potential value of \$143 million over the initial term. It includes annual renewal options for two additional years, valued at \$90 million per year.

Multi Solutions, Inc. has announced it has signed a license agreement with Philips Medical Systems, Inc. to utilize Multi Solutions' 51 operating system for software development. It is expected that in the near future, Philips will also sign a software distribution agreement to utilize the 51 operating system in a Philips product presently under development, which is expected to be marketed in early 1985.

Larry Hicks of E. J. Reynolds Tobacco Co. has been elected president of Software House, Inc.'s System 1022/1033 Users Group for 1984-85. Other officers elected include Susan Selthorpe, vice-president; Pat Farwell, secretary; Lynda Jones, treasurer; Rhonda Buxton, program coordinator; and Stuart Buxton, 1022 program coordinator. Now serving as an advisor is past president, Dave Eastman. Martin Roth is the vendor's advisor to the users group.

Computerworld/Japan can bring your message to the world's second largest computer market.

The Japanese computer industry is growing at a rate of 20% per year. There are currently more than 101,000 installed general purpose computers valued at over \$18 billion. This figure does not include minis, micros and personal computers. Small business computers are currently the leading growth sector in the Japanese computer market.

Japan is looking for well-developed technology that will meet their future needs. And with no strong independent software industry of its own, Japan offers great opportunity for U.S. manufacturers in the packaged software market.

Computerworld/Japan is a weekly publication covering the latest developments in the Japanese computer industry with reports on new products, services and trends. Its 30,000 subscribers include top management and DP professionals throughout the country.

CW International Marketing Services gives you one-stop advertising service in countries around the world. For more information on Computerworld/Japan or any of our other foreign publications, just fill out the coupon below.



Diane La Plante, Manager
International Marketing Services
CW COMMUNICATIONS, INC.
375 Commonwealth Blvd., Box 680
Framingham, MA 01701
(617) 879-0700

Please send me more information on:

☐ Computerworld/Japan ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____



CW COMMUNICATIONS, INC.
Publishers of Computerworld and other leading publications around the world.

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only EZTRAK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRAK offers:

- General query and interactive capabilities • Flexible report writer and graphics
- Full screen forms reporting

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone () _____

SEND COUPON NOW FOR COMPLETE DETAILS!

OWRK

STI Signal Technology, Inc.

19851 Encino Road, Encino, CA 91431 (805) 852-3771 (Outside California call toll-free (800) 852-3777)
TWX 810-324-3471

STI VMS is a trademark of Digital Equipment Corporation

COMPUTER INDUSTRY

RESELL from page 101

hungry students may be tempted to part with their Macintoshes for a quick several hundred dollars profit.

Already, classified advertisements have reportedly appeared in some campus newspapers offering to buy or sell Macintoshes. But there have been no reports yet of widespread black market dealing, although most consortium schools have received few, if any, machines up to now.

John Collins, a used computer salesman in Rockwall, Texas, said he has already purchased from students and resold 20 to 25 Macintoshes, thanks in part to advertisements he has placed in newspapers across the country. He said he makes from \$500 to \$600 profit after buying the computers for \$1,400 to \$1,600.

"I ask the students if they've ever signed an agreement saying they won't resell, and I try not to buy from [those who have]," Collins said. "I don't see how anyone can say it's unfair."

The black market problem comes as no surprise to Apple, according to Mark Cunningham, Apple's manager of university sales. "Our point of view is that reselling at some level probably will occur," he said. "Our feeling is that it will not be to any great extent."

APPLE from page 101

consortium members.

Cunningham noted that Apple isn't the first vendor to offer substantial discounts and donations to colleges — IBM and Digital Equipment Corp. have been doing so for some time, said the ACE's Johnson. "IBM and Apple are competing desperately to get into the universities to guarantee their future sales as well as to help their technological development."

Despite some strained relationships with its dealers, Apple said it remains committed to the program. "We don't regret doing it," Cunningham said.

BILL from page 101

speedy resolution to these differences." He said he expected a compromise bill could become law before the end of the year.

Noting the increasing use of electronics in the U.S., Mashey said passage of this legislation may eventually be considered "one of the more significant achievements of the 98th Congress."

In his view, he said, "the Senate's passage of this bill is a momentous event. It marks our recognition of the importance to our economy and to our society of the continued technological progress in the field of microelectronics."



But some university officials are taking the problem seriously. Consortium schools are devising various strategies designed to discourage, if not prevent, reselling.

The University of Michigan is requiring students to sign affidavits in which they agree not to resell or lease their Macintoshes for two years. Anyone caught violating the agreement could face a claim of \$2,000 damages by the school, said Greg Marks, special assistant to the provost. The school also will conduct spot surveys of buyers to see if they still own their machines.

"We have been very careful to make sure that this is the type of agreement that is enforceable," Marks said, noting that the school intends to prosecute violators.

Harvard University officials have

decided not to sell the Macintoshes directly to students, but rather to give them a 15-month lease. Students will not actually own the machines until the 15 months are up, said Paul Maritz, dean of the division of applied sciences.

The University of Chicago has taken a different approach. Students and faculty sign nonbinding statements saying they understand the Macintoshes are to be used for university purposes only and not resold. No disciplinary actions are contained in the statement, said George Busman, assistant director of the university's computation center.

"We're going to remain optimistic that the program will not be abused by students and faculty," Busman said. He added that the university does plan to watch local newspapers'

classified advertisements to spot anyone offering a Macintosh for sale. The university will attempt to contact the seller to determine if he is a student or staff member.

Drexel University in Philadelphia is seeking existing consortium schools to require all licensing freshmen to own or have easy access to a Macintosh.

The school already has some 2,600 Macintoshes in use by students and staff.

Because of that requirement, Drexel officials are not very concerned about students reselling the machines, said university spokesman Eric Rosenzweig. "At Drexel, the Macintosh is a required academic tool," he said. "A student would virtually be committing academic suicide to be without one."

POWER FOR YOUR APPLICATION DEVELOPMENT CENTER.

FOCUS DATABASE

SPANS ALL OF YOUR APPLICATIONS DEVELOPMENT NEEDS.

Now there's a fifth generation DBMS that gives you all the tools you need for fast applications development: FOCUS. Only FOCUS combines modern database technology and 3270 screen management with an English nonprocedural language for reporting, graphics, financial modeling and statistical analysis.

And FOCUS has the proven power and depth to stay with you as your application requirements become more demanding. With FOCUS, you can accomplish decision sup-

port, application prototyping, complete MIS systems—even COWOL replacement just as quickly as simpler tasks.

In addition, FOCUS' relational facilities enable you to query and report from any of your existing files and databases, (VSAM, QSAM, IMS, DMS, etc.). This preserves your investment in these files and eliminates the need for costly conversions.

And there's also PCFOCUS. It puts these same FOCUS facilities on your IBM Personal Computer, expanding it into an

applications development system that allows you to download, manipulate and/or upload data extracted from mainframe files and databases—all with full FOCUS security.

Span, depth and ease of use. Only FOCUS puts them together in a tool powerful enough to handle all of your critical applications development needs.

For details write to: Don Waselek, Dept. MS, Information Builders, Inc., 1299 Broadway, New York, NY 10001.

INFORMATION BUILDERS, INC.

New York: (212) 735-6423 • Washington, D.C.: (703) 276-7955 • St. Louis: (314) 634-7990 • Chicago: (312) 769-0815
Dallas: (214) 659-9990 • Palo Alto: (415) 334-9044 • Los Angeles: (213) 645-8738 • Houston: (713) 952-6366

POSITION ANNOUNCEMENTS

The Technology Designers



Communications Protocol Design Ottawa, Ontario Canada

BNR is intensively involved in the research and development of distributed voice and data services within private and public telecommunications networks.

Protocol designers are required to work on a wide variety of protocols including: value-added services, such as electronic mail, teleconferencing and electronic directories; product interfaces, including PBX-to-computers and central office switch-to-PBX; networking and terminals; for packet data and signaling networks; and Integrated Voice and Data terminals.

The role of these protocol designers will be to analyse requirements, recommend solutions and design the appropriate protocols in conjunction with product development groups. In some cases, active participation in national and international standards organizations will be required.

BNR locations:
United States: Ann Arbor, Michigan; Mountain View, California; Richardson, Texas; Research Triangle Park, North Carolina; and Atlanta, Georgia.
Canada: Edmonton, Toronto, Ottawa and Montreal.

These hi-tech challenges demand a university degree in electrical engineering or computer science and at least two years' experience in one or more of the following areas:

- computer networks and protocols
- data networks and protocols
- X.25, X.21
- open systems interconnection
- local area networks
- distributed applications and/or data management
- terminal protocols
- systems software/operating systems
- signaling protocols

BNR offers a complete benefits package and attractive compensation plan in recognition of your talents and contributions. If you would be interested in joining a team of top-flight professionals, please send your complete résumé to Warren Eberlin, Staffing Specialist.



An Equal Opportunity/
Affirmative Action Employer

DIRECTOR PRODUCT MARKETING

CTI, a rapidly expanding supplier of intelligent data communications products, has an exciting career opportunity for an experienced person to direct the Product Marketing activities.

Duties will include technical sales support, sales training, proposal preparation, customer presentations and development of product marketing strategy, plans and advertising program. The successful candidate will hold a BSEE or similar degree with 8 or more years of experience in IBM or IBM compatible products with specific IBM S/370 and PC knowledge.

We offer a highly attractive salary and liberal benefits, along with top growth potential and professional satisfaction.

For prompt, confidential consideration, please forward resume and salary history and requirements, to:

Professional Recruiter

CTI DATA Corporation
2775 North Boulevard
Raleigh, NC 27604

CTI

An Equal Opportunity Employer M/F

IBM SERIES/1 EDX/EDL

Contract programming opportunities. AIC Analyst Corporation is expanding their IBM Series/1 consulting staff. If you have 2+ years of experience using EDX/EDL, and you are interested in state-of-the-art challenges, we are anxious to discuss a career opportunity with you. In reward for your experience and technical expertise, AIC offers a highly competitive salary and benefits package. Please call or send your resume in confidence to:

Analyst International Corporation
1201 North Watson
Suite 130
Arlington, TX 76011
(817) 840-8981

Independent contractor positions also available.

SYSTEMS PROGRAMMERS

MVS - CICS - SAS

Our client companies nationwide have special opportunities for experienced SYSTEMS PROGRAMMERS who are career oriented and looking for professional challenges.

If you feel it is time to expand your experience and talents, call us or send your resume. Confidentiality is assured.

All fees and relocation expenses paid by our client companies.



Meredith & Associates, Inc.

4001 N. 32nd St.

(602) 964-7100

Phoenix, AZ 85018

CHECK WITH US

Career Positions Available
Louisiana, Texas, Gulf Coast

Manager • Sys Prog • Prod Prog

• DB Anal • Sys Anal • Prog Anal

OCUMER, COCOAL, SCL, MAPCS,

MSK, LEO, PA, PWSK,

FEE AND EXPENSES PAID

Send resume or call

Jerry Doherty

Branch of Shreveport, Inc.

P.O. Box 5476

Shreveport, LA 71105-6476

(514) 881-3576

\$30 - \$40 PER HOUR COMPUTERWARE, INC. - LUCRATIVE CONTRACTS

We develop programs covering business and scientific applications and current opportunities. A representative sampling of current opportunities follows:

HOWBESTW

Transportation, city of all pro-

cessing, building systems,

San Antonio, Texas

ELMPORTWA

San Antonio, Texas

San Antonio, Texas

San Antonio, Texas

San Antonio, Texas

San Antonio, Texas

San Antonio, Texas

\$24,000-\$80,000 +

Call Steve Jones toll free at 1-800-

447-1989

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

Lockheed-Georgia Company DATA PROCESSING SPECIALISTS



The Lockheed-Georgia Company, world-renowned leader in defense technology offers challenging careers in the following areas:

IBM MVS SYSTEM SOFTWARE SPECIALIST

Position requires a minimum of three (3) years experience in support of large IBM mainframe or compatible computers using the latest IBM software. Must be able to perform JCL, REXX, and maintenance using SMF, trouble shoot system problems and performance tune and measure in a TSO environment. Assembly language programming knowledge.

REQUIREMENTS - IBM 3081 K, 30, IBM 3082, 3085, 3090, 1405, 3095, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3863, 3864, 3865, 3866, 3867, 3868, 3869, 3870, 3871, 3872, 3873, 3874, 3875, 3876, 3877, 3878, 3879, 3880, 3881, 3882, 3883, 3884, 3885, 3886, 3887, 3888, 3889, 3890, 3891, 3892, 3893, 3894, 3895, 3896, 3897, 3898, 3899, 3900, 3901, 3902, 3903, 3904, 3905, 3906, 3907, 3908, 3909, 3910, 3911, 3912, 3913, 3914, 3915, 3916, 3917, 3918, 3919, 3920, 3921, 3922, 3923, 3924, 3925, 3926, 3927, 3928, 3929, 3930, 3931, 3932, 3933, 3934, 3935, 3936, 3937, 3938, 3939, 3940, 3941, 3942, 3943, 3944, 3945, 3946, 3947, 3948, 3949, 3950, 3951, 3952, 3953, 3954, 3955, 3956, 3957, 3958, 3959, 3960, 3961, 3962, 3963, 3964, 3965, 3966, 3967, 3968, 3969, 3970, 3971, 3972, 3973, 3974, 3975, 3976, 3977, 3978, 3979, 3980, 3981, 3982, 3983, 3984, 3985, 3986, 3987, 3988, 3989, 3990, 3991, 3992, 3993, 3994, 3995, 3996, 3997, 3998, 3999, 4000, 4001, 4002, 4003, 4004, 4005, 4006, 4007, 4008, 4009, 4010, 4011, 4012, 4013, 4014, 4015, 4016, 4017, 4018, 4019, 4020, 4021, 4022, 4023, 4024, 4025, 4026, 4027, 4028, 4029, 4030, 4031, 4032, 4033, 4034, 4035, 4036, 4037, 4038, 4039, 4040, 4041, 4042, 4043, 4044, 4045, 4046, 4047, 4048, 4049, 4050, 4051, 4052, 4053, 4054, 4055, 4056, 4057, 4058, 4059, 4060, 4061, 4062, 4063, 4064, 4065, 4066, 4067, 4068, 4069, 4070, 4071, 4072, 4073, 4074, 4075, 4076, 4077, 4078, 4079, 4080, 4081, 4082, 4083, 4084, 4085, 4086, 4087, 4088, 4089, 4090, 4091, 4092, 4093, 4094, 4095, 4096, 4097, 4098, 4099, 4100, 4101, 4102, 4103, 4104, 4105, 4106, 4107, 4108, 4109, 4110, 4111, 4112, 4113, 4114, 4115, 4116, 4117, 4118, 4119, 4120, 4121, 4122, 4123, 4124, 4125, 4126, 4127, 4128, 4129, 4130, 4131, 4132, 4133, 4134, 4135, 4136, 4137, 4138, 4139, 4140, 4141, 4142, 4143, 4144, 4145, 4146, 4147, 4148, 4149, 4150, 4151, 4152, 4153, 4154, 4155, 4156, 4157, 4158, 4159, 4160, 4161, 4162, 4163, 4164, 4165, 4166, 4167, 4168, 4169, 4170, 4171, 4172, 4173, 4174, 4175, 4176, 4177, 4178, 4179, 4180, 4181, 4182, 4183, 4184, 4185, 4186, 4187, 4188, 4189, 4190, 4191, 4192, 4193, 4194, 4195, 4196, 4197, 4198, 4199, 4200, 4201, 4202, 4203, 4204, 4205, 4206, 4207, 4208, 4209, 4210, 4211, 4212, 4213, 4214, 4215, 4216, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4225, 4226, 4227, 4228, 4229, 4230, 4231, 4232, 4233, 4234, 4235, 4236, 4237, 4238, 4239, 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 4248, 4249, 4250, 4251, 4252, 4253, 4254, 4255, 4256, 4257, 4258, 4259, 4260, 4261, 4262, 4263, 4264, 4265, 4266, 4267, 4268, 4269, 4270, 4271, 4272, 4273, 4274, 4275, 4276, 4277, 4278, 4279, 4280, 4281, 4282, 4283, 4284, 4285, 4286, 4287, 4288, 4289, 4290, 4291, 4292, 4293, 4294, 4295, 4296, 4297, 4298, 4299, 4300, 4301, 4302, 4303, 4304, 4305, 4306, 4307, 4308, 4309, 4310, 4311, 4312, 4313, 4314, 4315, 4316, 4317, 4318, 4319, 4320, 4321, 4322, 4323, 4324, 4325, 4326, 4327, 4328, 4329, 4330, 4331, 4332, 4333, 4334, 4335, 4336, 4337, 4338, 4339, 4340, 4341, 4342, 4343, 4344, 4345, 4346, 4347, 4348, 4349, 4350, 4351, 4352, 4353, 4354, 4355, 4356, 4357, 4358, 4359, 4360, 4361, 4362, 4363, 4364, 4365, 4366, 4367, 4368, 4369, 4370, 4371, 4372, 4373, 4374, 4375, 4376, 4377, 4378, 4379, 4380, 4381, 4382, 4383, 4384, 4385, 4386, 4387, 4388, 4389, 4390, 4391, 4392, 4393, 4394, 4395, 4396, 4397, 4398, 4399, 4400, 4401, 4402, 4403, 4404, 4405, 4406, 4407, 4408, 4409, 4410, 4411, 4412, 4413, 4414, 4415, 4416, 4417, 4418, 4419, 4420, 4421, 4422, 4423, 4424, 4425, 4426, 4427, 4428, 4429, 4430, 4431, 4432, 4433, 4434, 4435, 4436, 4437, 4438, 4439, 4440, 4441, 4442, 4443, 4444, 4445, 4446, 4447, 4448, 4449, 4450, 4451, 4452, 4453, 4454, 4455, 4456, 4457, 4458, 4459, 4460, 4461, 4462, 4463, 4464, 4465, 4466, 4467, 4468, 4469, 4470, 4471, 4472, 4473, 4474, 4475, 4476, 4477, 4478, 4479, 4480, 4481, 4482, 4483, 4484, 4485, 4486, 4487, 4488, 4489, 4490, 4491, 4492, 4493, 4494, 4495, 4496, 4497, 4498, 4499, 4500, 4501, 4502, 4503, 4504, 4505, 4506, 4507, 4508, 4509, 4510, 4511, 4512, 4513, 4514, 4515, 4516, 4517, 4518, 4519, 4520, 4521, 4522, 4523, 4524, 4525, 4526, 4527, 4528, 4529, 4530, 4531, 4532, 4533, 4534, 4535, 4536, 4537, 4538, 4539, 4540, 4541, 4542, 4543, 4544, 4545, 4546, 4547, 4548, 4549, 4550, 4551, 4552, 4553, 4554, 4555, 4556, 4557, 4558, 4559, 4560, 4561, 4562, 4563, 4564, 4565, 4566, 4567, 4568, 4569, 4570, 4571, 4572, 4573, 4574, 4575, 4576, 4577, 4578, 4579, 4580, 4581, 4582, 4583, 4584, 4585, 4586, 4587, 4588, 4589, 4590, 4591, 4592, 4593, 4594, 4595, 4596, 4597, 4598, 4599, 4600, 4601, 4602, 4603, 4604, 4605, 4606, 4607, 4608, 4609, 4610, 4611, 4612, 4613, 4614, 4615, 4616, 4617, 4618, 4619, 4620, 4621, 4622, 4623, 4624, 4625, 4626, 4627, 4628, 4629, 4630, 4631, 4632, 4633, 4634, 4635, 4636, 4637, 4638, 4639, 4640, 4641, 4642, 4643, 4644, 4645, 4646, 4647, 4648, 4649, 4650, 4651, 4652, 4653, 4654, 4655, 4656, 4657, 4658, 4659, 4660, 4661, 4662, 4663, 4664, 4665, 4666, 4667, 4668, 4669, 4670, 4671, 4672, 4673, 4674, 4675, 4676, 4677, 4678, 4679, 4680, 4681, 4682, 4683, 4684, 4685, 4686, 4687, 4688, 4689, 4690, 4691, 4692, 4693, 4694, 4695, 4696, 4697, 4698, 4699, 4700, 4701, 4702, 4703, 4704, 4705, 4706, 4707, 4708, 4709, 4710, 4711, 4712, 4713, 4714, 4715, 4716, 4717, 4718, 4719, 4720, 4721, 4722, 4723, 4724, 4725, 4726, 4727, 4728, 4729, 4730, 4731, 4732, 4733, 4734, 4735, 4736, 4737, 4738, 4739, 4740, 4741, 4742, 4743, 4744, 4745, 4746, 4747, 4748, 4749, 4750, 4751, 4752, 4753, 4754, 4755, 4756, 4757, 4758, 4759, 4760, 4761, 4762, 4763, 4764, 4765, 4766, 4767, 4768, 4769, 4770, 4771, 4772, 4773, 4774, 4775, 4776, 4777, 4778, 4779, 4780, 4781, 4782, 4783, 4784, 4785, 4786, 4787, 4788, 4789, 4790, 4791, 4792, 4793, 4794, 4795, 4796, 4797, 4798, 4799, 4800, 4801, 4802, 4803, 4804, 4805, 4806, 4807, 4808, 4809, 4810, 4811, 4812, 4813, 4814, 4815, 4816, 4817, 4818, 4819, 4820, 4821, 4822, 4823, 4824, 4825, 4826, 4827, 4828, 4829, 4830, 4831, 4832, 4833, 4834, 4835, 4836, 4837, 4838, 4839, 4840, 4841, 4842, 4843, 4844, 4845, 4846, 4847, 4848, 4849, 4850, 4851, 4852, 4853, 4854, 4855, 4856, 4857, 4858, 4859, 4860, 4861, 4862, 4863, 4864, 4865, 4866, 4867, 4868, 4869, 4870, 4871, 4872, 4873, 4874, 4875, 4876, 4877, 4878, 4879, 4880, 4881, 4882, 4883, 4884, 4885, 4886, 4887, 4888, 4889, 4890, 4891, 4892, 4893, 4894, 4895, 4896, 4897, 4898, 4899, 4900, 4901, 4902, 4903, 4904, 4905, 4906, 4907, 4908, 4909, 4910, 4911, 4912, 4913, 4914, 4915, 4916, 4917, 4918, 4919, 4920, 4921, 4922, 4923, 4924, 4925, 4926, 4927, 4928, 4929, 4930, 4931, 4932, 4933, 4934, 4935, 4936, 4937, 4938, 4939, 4940, 4941, 4942, 4943, 4944, 4945, 4946, 4947, 4948, 4949, 4950, 4951, 4952, 4953, 4954, 4955, 4956, 4957, 4958, 4959, 4960, 4961, 4962, 4963, 4964, 4965, 4966, 4967, 4968, 4969, 4970, 4971, 4972, 4973, 4974, 4975, 4976, 4977, 4978, 4979, 4980, 4981, 4982, 4983, 4984, 4985, 4986, 4987, 4988, 4989, 4990, 4991, 4992, 4993, 4994, 4995, 4996, 4997, 4998, 4999, 5000, 5001, 5002, 5003, 5004, 5005, 5006, 5007, 5008, 5009, 5010, 5011, 5012, 5013, 5014, 5015, 5016, 5017, 5018, 5019, 5020, 5021, 5022, 5023, 5024, 5025, 5026, 5027, 5028, 5029, 5030, 5031, 5032, 5033, 5034, 5035, 5036, 5037, 5038, 5039, 5040, 5041, 5042, 5043, 5044, 5045, 5046, 5047, 5048, 5049, 5050, 5051, 505

"Sold On Cincom."

British born Steve Rudin, like many Cincomers, is truly an international software salesperson. His career with Cincom Systems has taken him to Australia, New Zealand, and the United States. Steve is currently Manager of Cincom's Eastern U.S. Region. From a recent interview, here are Steve's thoughts on Cincom's approach to software sales and what he looks for in recruiting software salespeople.

Important Software Selling Traits:

"Three of the most important traits I look for in sales candidates are perception, integrity, and determination. Perception gives a salesperson the ability to understand what the customer's needs are and which software can most effectively solve those needs. Integrity is important because it's at the very heart of everything Cincom holds dear. And thirdly, I think every good salesperson should be very determined."

Cincom's Commitment To R&D:

"We've found that the best thing we can do for our sales force and our clients is to provide leading edge products, backed by the best support possible. That's why Cincom is so devoted to Research & Development. Nearly 22% of our total annual revenues go to not new R&D. That's not maintenance of older products—but creation of new. The result of our R&D concentration has been products like MANTIS[®], our application development language, which has taken the industry by storm. Products like TIS[®],

ULTRA INTERACTIVE DATA BASE SYSTEM[®], MRPS, and our new MANAGE USER SERIES[®] are also gaining an international reputation as some of the best software systems of their kind."

Selling For A Full Service Vendor:

"Along with R&D every Cincom salesperson is backed up by a comprehensive software support commitment. Cincom salespeople can, with confidence, guarantee things like support, service and user education and never worry about the commitment of the people and the company behind these promises. In essence, working with Cincom makes it easier to become a successful salesperson. And if you are already successful, Cincom can help you become even more successful."

Outstanding Rewards For Outstanding Performance:

"Cincom has no ceiling on the income our sales people can earn. We ask a lot—and we provide a lot. So, when an individual performs in an outstanding manner they are rewarded very well. The success factor among Cincom salespeople is very high. They are motivated and their contributions are well appreciated."

On Software Excellence:

"Software is a people product. The better one's people, the better one's software. This is why we go to such great lengths to find the most talented and the most achievement-oriented people available."

On Working With Cincom:

"My own experience is perhaps the best example I have to encourage people to join the Cincom team. I've learned a great deal from this and with this company. I've come a long way. And I'm just one of hundreds of Cincom people who can say the same thing. I'm sold on Cincom. And I'm very proud to be a Cincomer. If you feel that you are one of those rare people who combine all of the attributes we've been talking of, you, too, will likely be most happy to be one of us."

Support, Sales, Marketing and Development. We're looking for experienced self-starters in all of these areas.

For more information on a career with Cincom Systems, send a cover letter and a resume to: Marilyn Jacobs, 2300 Mountain Avenue, Cincinnati, Ohio 45211. Or, call: 1-800-543-3011.



 **Cincom Systems**

Excellence in Software Technology.

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS



NEW CHALLENGES IN TELECOMMUNICATIONS DESIGN AND DEVELOPMENT

The explosive growth of telecommunications, and the many technological advancements supporting this growth, are a large measure of the level of advances in digital switching technology. At Digital Switch Corporation, we are committed to taking on the challenges the age of communication has created by providing state-of-the-art switching systems adaptable to the most advanced techniques of information exchange.

If your background is in telephone design and development with experience in any of the following areas, we invite you to share the technological adventure with us:

CALL PROCESSING
Design and development of real-time telephone, attendant, trunk control and call processing software.

SYSTEMS/SCALABILITY
Design and development of configuration, control and diagnostics software for distributed processing systems.

OFFICELESS OFFICE
Design and development of real-time operating systems software for distributed microprocessor based systems. Software includes: nucleus (process and memory management, inter-process communication), dialogue processor (start-up, file management and utilities, data link communication protocols, and main-machine interface).

GENERAL ADMINISTRATION
Design and development of distributed processing software for database management system, performance monitoring (traffic measurements), call data recording (CDR), system overload management and telephone network management.

WIDEAREA DESIGN
Design experience should include microprocessor communication interfaces, peripheral controllers and memory systems. Minimum of three years experience designing T1 interfaces, time or token for digital control offices, TDD's or subscriber carrier equipment familiar with AD, TDD or other microprocessors, as well as dynamic time components is a must.

SYSTEM INTEGRATION AND SUPPORT
Hardware and software test and integration on system level interface with customer and field operations.

All positions require a BS/MS CS, EE, Math or related discipline. Experience with Assembly language and/or "C" highly desirable. We can offer excellent technical resources, salary and benefits, and the chance to apply new training to complex engineering problems.

For immediate consideration, please send your resume to Staffing Manager, Dept. 1022 CW 1028 Digital Switch Corporation, P.O. Box 830711, Richardson, TX 75083-0711.

Equal Opportunity Employer



Digital Switch
Corporation



GROW IN A
FARE ENVIRONMENT

EDP PROFESSIONALS

If you're a top flight, top 10% achiever in your profession, here's an opportunity to work with the innovative leader in the New England financial community.

A structured analysis and project management philosophy, where you can participate in every project phase, forms the foundation of the systems development process at Bank of Boston. We have openings for professionals with 3-10 years of experience in:

- **Systems Development.** You will work with IBM 3033, 3081, MVS, FOCUS, TSO/SPF, IDMS DB/DC, MSA and UCC applications packages and a host of additional specialized packages.
- **Systems Research.** Projects will involve Wang OIS Office Systems, IBM, Apple, Wang, DEC, TRS-80 and Compaq PCs.
- **Telecommunications.** We'll give you project design and implementation exposure to both SNA-S705, and LAN pack switching, x.25 communications technology.

Bank of Boston offers the comprehensive benefits program you deserve. Join us now while we develop major new projects in an expanding industry—changes that require the best minds in EDP. If you are that top 10% individual, and you seek real challenge and career flexibility, write to Thomas Matera, Bank of Boston, P.O. Box 1976—CM, Boston, MA 02105.

See us at The TeleJob Fair at
Howard Johnson's 57 Hotel, Boston, June 14, 4-8 PM.



BANK OF BOSTON

An Equal Opportunity Employer M/F

© 1984 The First National Bank of Boston

YOUR FUTURE

IN FLORIDA

Move up to consulting status with leading consulting firms. We are looking for experienced consultants with expertise in any one of the following areas:

1. COBOL STRUCTURED TECHNIQUES
2. PL/I, IMS DB/DC
3. DATA-COMMERCE
4. IBM DATA BASE ANALYSTS
5. SYSTEMS/PROGRAMMER, HEAVY TRAFFIC
6. COBOL, HOLLAND 2
7. IBM SERIES 1, EOL, EOLX

We offer paid relocation, excellent benefits and salary commensurate to experience.

Send resume to:
Mr. Fred J. Pawlaczky
Corporate Technical Director

**SOFTWARE
SERVICES
OF FLORIDA INC.**

A subsidiary of
**AMERICAN
INTERNATIONAL INC.**

PARAGON CROSSING, SUITE 104, 14300 HWY 17 N. ST. PETERSBURG, FL 33707
(813) 577-4475

Select Software Engineers/Managers



If your software engineering career is at a point where challenging projects and a superb professional environment are what you need, Northrop Aerospace Division, in Southern California can offer you assignments of major scope and career prospects of real substance.

If your qualifications are outlined below, ask your self: Isn't it time you joined Northrop?

SOFTWARE VERIFICATION & VALIDATION

We'll define the test methodology for verifying and validating the LUT software. This position entails thorough understanding of the requirements of MIL-STD-463. You will review and support requirements definition and develop a comprehensive test methodology to ensure that the design meets the requirements. A minimum of 7 years in the area of software development and validation, a BS Degree in Computer Science or related area and knowledge in FORTRAN and assembly required. MS preferred.

ATE SOFTWARE ENGINEERS

- Will design, develop, test and document software for the FSE/DSE. The basic software elements to be developed include station self test, station calibration and station fault isolation. The candidate will use structured techniques for software development and participate in the design and code walkthroughs. A minimum of 7 years in the area of software development with emphasis on ATE software, a BS Degree in Computer Science or related area and knowledge of FORTRAN and assembly is required. An MS preferred.
- Will design, develop, test and document station selftest software. The candidate will also develop quality test methodology and implement them in order to verify and validate the station selftest software. Will also present the development process design, code and test documentation to the customer and interface with the test equipment designers to ensure that the selftest software meets contractual needs. A minimum of 10 years in developing ATE software or related area and knowledge of ATLAS is helpful. A BS Degree in

Computer Science or related area and knowledge in FORTRAN and assembly required. An MS preferred.

SOFTWARE SUPPORT ENGINEERS

We'll design and develop software for the engineering evaluation tests. The position will involve understanding the test requirements and designing new and/or adapting existing LUT software to meet the needs of the test. Some maintenance support and documentation effort will be required as a part of the job. Experience in a real-time environment with systems background preferred but not required. A BS Degree in Computer Science or related area and knowledge of FORTRAN and assembly required. MS preferred.

SOFTWARE SYSTEMS ANALYST

- Will be the nucleus for building the real-time software for the depot support equipment and the MOD APRE program. Will also provide the software engineering technology base which includes implementing a standard applicable to each specific product and support management in the decision making process. An advanced degree in computer science, computer familiarity with software engineering as it applies to real-time software with emphasis on testability, thorough understanding of real-time systems.
- Will design and develop software for the AHS program. The candidate will interface with Honeywell and understand the requirements, test their feasibility, develop a high level design and manage technical team to complete the software.

SOFTWARE TECHNICAL WRITER

Will function as a technical writer to develop documentation in accordance with Military Standard 463. Duties will include coordinating the requirements and developing a requirements document, coordinating and reviewing a

design document, user's guide and supporting software review. 3+ years experience in the area of documentation and software development and a BS Degree in Engineering with emphasis on computer science and knowledge of FORTRAN and assembly language is required.

SOFTWARE ENGINEERS

- Will develop the LUT software for the FSE/DSE program. You will also review requirements, design, code and test software, as well as document the software in accordance with MIL-STD-463 and participate in both in-house reviews and formal presentation with the customer. You will also be required to interface with the systems engineers in defining software requirements. A minimum of 7 years in real-time software development, a BS Degree in Computer Science or related area and knowledge in FORTRAN and assembly is required. MS preferred.
- Will design, code and test real-time software in the area of LUT (Load Under Test) diagnostics. Duties will also include documenting the software and participating in both in-house reviews and reviews with the customer. 3+ years in the area of real-time software, a BS Degree in Computer Science and knowledge of a high order language and assembly language is required. MS preferred.

SOFTWARE UNIT MANAGERS

- Diagnose and assist software. You will manage an organization with a group size of about 18 to develop LUT test diagnostics. The group will also develop station selftest, diagnostics and calibration software. This position entails the following activities:

Staffing—Will be responsible for staffing the group currently consisting of 12 personnel. C/SCSC—Support the branch manager for cost control and scheduling.

Technical—Will review requirements (in TRO format) and assist 2 test engineers in developing software.

Product leadership in real-time software development and an understanding of software engineering with a degree in computer science is required.

- Real-time software development—You will manage an organization with a group size of about 18 to develop the following:
AHSS Software in a ground processor software program.

MOD APRE-1750 headset navigation software, and ground processor software.

Product leadership in real-time software development and an understanding of software engineering with a degree in computer science is required.

For the above 2 positions, contact: James Dumas

**TO ARRANGE FOR A CONVENIENT INTERVIEW
CALL Marie Wilks
(213) 777-1776**

(Monday thru Friday, 9:00 am to 5:30 pm, PDT)

At Northrop Aerospace Division you will enjoy a fine salary and excellent fringe benefits. A strong educational background and a resume and salary history to

Marie Wilks • Professional Employment
2291 West Wilks Street • Dept. CW 8-88
Northridge, CA 91359

ELECTRONICS DIVISION



NORTHROP

Making Advanced Technology Work

U.S. CITIZENSHIP REQUIRED • Equal Opportunity Employer M/F/H



POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

Systems Engineers

IBM is looking for professionals who can fill key technical support roles in:

Washington, D.C. or
Winston-Salem, N.C. or
Greensboro, N.C. or
Raleigh, N.C. or
Columbia, S.C. or
Greenville, S.C.

Required qualifications:

- Talent in working in customer environments
- At least 5 years working with MVS, performing system generations and maintenance of the Operating System and associated licensed program software

IBM's National Marketing Division will give you broader systems/applications exposure to our entire line of software.

Knowledge of MVS internals, IMS, CICS or SNA communications products... and manufacturing system programming support... is preferred.

Salaries, benefits, career prospects with IBM are excellent.

Please send your resume in complete confidence to: IBM Corporation, Central Employment Office, P.O. Box 33273, Dept. CW-528, 1801 K Street, N.W., Washington, DC 20006.

An equal opportunity employer

DATA BASE ADMINISTRATOR

Two to four years IBM/MSI experience with increasing responsibility in administering data bases for performance, logical and physical data base design, data base organization and recovery procedures. Must be able to communicate and work with computer users. Experience in an IBM CORP/MSI environment desirable as well as experience in NATURAL, COBOL, CICS and JCL/MSI. A college degree is required, experience with all existing data base utility would be helpful. Send resume and salary requirements to: Director, Personnel Division, Ontario Utilities Commission, P.O. Box 3198, Oshawa, ON, L1H 8S8.

An Equal Opportunity Employer M/F

NORTH CAROLINA LOCATIONS PROGRAMMER ANALYST AND PROGRAMMERS

We currently have 60+ openings with our I.C. client companies, IBM, Honeywell or Burroughs with COBOL and CICS on MVS a plus. Salary range \$25-\$35,000.

Please send resume to: Peggy Allen, CP Recruiter or call collect (919) 380-3900.

Graham & Associates
Employment Consultants
3100-41 West Cornwallis Drive
Greensboro, NC 27406-7090

Communications PRINCIPAL ANALYST

Leading user computer development organization desires additional resources in their software area. Job duties will include design, development and test of the locally coupled network product which allows IBM mainframes to communicate with other mainframe types. Computer experience should include IBM operating system MVS, COBOL, FORTRAN, and CICS. CICS/DB2 job experience. Candidates should have a BS in computer science with 4 years experience or a minimum of 6 years equivalent experience. Salary for this position is \$40K plus. Send resume to: Henry Thompson

Contact #3-45
M.D.E.A.

308 Second Avenue South
Minneapolis, MN 55401
Equal Opportunity Employer

Data Processing

Senior Analysts/ Programmer Analysts

Explore The Infinite Boundaries
Of Telecommunications
With Northern Telecom in North Carolina

There's no limit to the imagination, and there's no limit to how far you can take you with Northern Telecom. We provide a foundation of years of innovation, plus full support to good ideas, and provide a creative atmosphere to generate those ideas. Turning the possible into the probable and the probable into reality has made Northern Telecom the largest supplier of digital telecommunications systems in the world.

We offer exciting career opportunities for those individuals who wish to join a company at the forefront of telecommunications and information processing. We are particularly interested in Senior Analysts/Programmer Analysts who are willing to learn fourth generation languages; want to use the latest technology to develop applications software on a distributed network of information processing equipment; are interested in a problem-solving environment and like to utilize analytical skills.

Successful applicants will have a degree in Computer Science or related field, plus experience in one or more of the following areas: HP 3000/HP 1000, IBM MVS/MSI, REXX/2000 Product Group, REXX II, COBOL/Fortran, Image, Tolt, V Plus, RJE, ISRU, IML, BMS, Manufacturing and/or Quality applications, HP 100/100A PC.

North Carolina is a place where you can enjoy the high-technology challenge along with a scenic drive in the gently rolling hills, the sight of early morning mist among the pines and the quiet beauty of the nearby beaches. We'll pay for your relocation and provide you with competitive compensation and benefits. Send your resume, in confidence, to the address below.

Manager, Professional Staffing-COBS

Dept. 1018
Northern Telecom Inc.
P.O. Box 12947
4001 E. Chapel Hill-Nelson Hwy.
Research Triangle Park, N.C. 27709

An equal opportunity employer M/F/H/V



We hire talent

nt northern
telecom



EXPERIENCE
THE PRIDE OF
OWNERSHIP

Pride in yourself, your work, and your company. It's a new tradition started by the owners of Eastern Airlines. And they're not people like you. Join the owners at Eastern and start feeling the pride.

BAL PROGRAMMERS

We're currently seeking programmers who have at least one year of IBM Basic Assembler Language programming experience. These individuals will be trained as programmers for our Real-Time Reservation Computer Center.

Eastern is a leader in airline computer technology having 3 IBM 3085's and 5 IBM 3037's. Our Real-Time reservation service approximately 20,000 on-line terminals. We offer excellent short term career growth opportunity, company paid dental, medical, life and retirement insurance, relocation reimbursement and outstanding worldwide travel discounts. Living in Florida offers a sun filled casual outdoor lifestyle with no state income tax.

If interested, please call Marilyn Brooker at (305) 872-3880 for more information or send a detailed resume to: Eastern Airlines, Management Recruit., Department 100, International Airport, Miami, Florida 33148. We are an equal opportunity employer.

We earn our
wings every day



POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

Progress, the by-product of innovation, is an Intel tradition. This leadership quality is well documented on the components side. Now, we're putting that same tradition to work in the area of systems with advancements such as our super-powerful, supermicro system for OEMs, the 286/310, to date the most powerful we've ever made. When it comes to systems integration, we're out in front with our IDIS Database Information System. Our ITAPS Transaction Processing System handles up to 16 users and allows for the development of individual application software 50% faster.

While we have grown in size, strength and technology, we have not lost sight of the qualities that put us out in front. You will still find a highly charged atmosphere of discovery and mutual respect. We still place a high premium on finding people who have inquiring minds, strong technical skills, and the ability to adapt quickly to changing situations. If you're an engineer

involved with SOFTWARE EVALUATION, PRODUCT MARKETING, HARDWARE SYSTEMS, DIAGNOSTICS, CUSTOMER SERVICE, SYSTEMS SOFTWARE, CAD, PRODUCT EVALUATION, GRAPHICS, HIGH-LEVEL LANGUAGES, OPERATING SYSTEMS, COMPILER, RELIABILITY, TECHNICAL MARKETING, or DATABASE MANAGEMENT SYSTEMS, and want to see your work integrated into sophisticated new systems, let's talk.

Intel offers competitive compensation, advancement based on achievement, and the chance to work with some of the best minds in American industry. For consideration at Intel sites in Phoenix, AZ; Santa Clara, CA; Portland, OR; and Austin, TX, please direct your responses to: Mike Gore, Intel Corporation, Dept. 8826, 2402 W. Beardsley Rd., Phoenix, AZ 85027. All inquiries will be answered promptly and held in strict confidence. An Equal Opportunity Employer M/F/H.

The Intel logo, consisting of the word "intel" in a lowercase, sans-serif font. The letter "i" is stylized with a dot that is slightly offset to the right.

LIFE AT DATA GENERAL

**DEVELOPMENT ENGINEERS,
MARKETING PROS AND
SEMICONDUCTOR TECHNOLOGISTS—**

If you're looking for close project involvement, excitement, fast concept-to-ship cycles, excitement, leading-edge performance, and excitement, we give you four choices.

Data General's winning ways have made us a Fortune 400 corporation—growing fast. We are looking for talented people to take up important roles in our growth. In Westboro, MA, in Research Triangle Park, NC, in Austin, TX, and in Sunnyvale, CA.

All four share the Data General spirit. With small, close-knit groups working their own projects to completion. With extraordinarily fast concept-to-ship cycles. With the glow of winning the industry's hottest contracts. And all four have openings for engineers, product leaders, managers, and more. Here's the break-out:

The Works at Westboro

Here at corporate headquarters, our largest facility, CPU, and Mass Storage hardware teams are at work on new systems and follow-ups for the very successful MV 10000, MV 6000C and DESKTOP GENERATION™. And integrating HW and SW for future office automation and industrial automation products, with major efforts in communications and text and graphics manipulation.

For marketing pros, we have openings for marketing communications and product planning managers in each of our divisions—Desktop Products, Technical Products, and Information Systems.

For more information, here's who to contact:

Hardware Development:

Emily Atkinson

Software Development:

Karl Bowden

Mass Storage Development:

Steve Grossman

Marketing:

Erin Motammi

All at: D134-72, Data General Corporation, 4400 Computer Drive, Westboro, MA 01580.

We're ready to hire qualified sales professionals, systems and field engineers, and manufacturing experts for openings across the country. Send your resume to our Westboro Corporate Headquarters.

Investing in people to make equal opportunity employment a reality.

Systems in the Research Triangle

Here we're doing advanced systems work, including an industry-leading effort in artificial intelligence...the ultimate in systems integration...major work in UNIX®/VS and other UNIX software products.

To see about joining us in this new hot-bed of high tech, send your resume to: John Bushfield, Data General Corporation, 62 TW Alexander Drive, Research Triangle Park, NC 27709.

Peripherals in Austin

The focus here is on graphics software, and terminal and printer development using new imaging technologies, voice and data integration, exploration of all the printer technologies, and more.

To join us in this most interesting new technological community of the great Southwest, send your resume to: Will Paves, Data General Corporation, 2706 Montopolis Drive, Austin, TX 78741.

Semiconductors in Sunnyvale

Here the action centers around a long-term commitment to VLSI, with major projects in our unique vertically-integrated chips, and very high-speed gate arrays. Work that will bring us to our next-generation super-minis.

To move as fast as you can in design, process development, NIMOS or CMOS technologies, send your resume to: Fred Staudmyer, Data General Corporation, 433 North Mathilde Avenue, Sunnyvale, CA 94089.

 **Data General**
careers a generation ahead.

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

Enjoy career fulfillment in a most exciting city with a most exciting company!

Martin Marietta Data Systems Washington, D.C.

The vanguard position of Martin Marietta Data Systems in total systems integration, constantly updated software and hardware products, remote computing ... together with our merger with highly respected Mathematica of Princeton ... has resulted in a spectacular influx of new business... and equally impressive opportunities for seasoned, innovative DP professionals.

IDMS APPLICATIONS PROGRAMMERS You will work in a large-scale IBM environment. Applications experience should include medical, financial or insurance. Knowledge of database systems, specifically IDMS, or other CODASYL databases required.

Q.A. MANAGERS Requires 8 years' significant experience in DP planning, organizing, estimating, budget control and managing of personnel resources. Experience should include Configuration Management, hardware and software testing, standards enforcement and documentation.

Q.A. SPECIALISTS Review deliverable products for completeness and conformity to standards. Products include: specifications, functional programs and database. Also includes test plans and reports. You should have 2-3 years' experience in Quality Assurance or a strong applications programming background.

For immediate consideration, please call P.H. Shockley toll free at (800) 488-6753 (In Maryland, (301) 868-8677) daily, or send your resume in confidence to: Martin Marietta Data Systems, 6306 Ivy Lane, Greenbelt, Maryland 20770.

An equal opportunity employer.
Principals only.



MARTIN MARIETTA

MIS Manager

New Balance, a leader in the sporting goods industry, has an exceptional opportunity for a professional to plan and direct all computer operations for the company's US facilities. Reporting to the corporate treasurer, you will ensure the application of computer technology to attain management systems objectives during and following our conversion to an IBM 4341 system.

You will develop and direct MIS staff to meet responsibilities including systems development, internal user interface, training, presentations to top management, equipment evaluation and budget preparation. We require a minimum of 10-12 years of increasing supervisory responsibilities in a manufacturing environment. A Masters degree in MIS/Computer Science is preferred. If you qualify we can offer you an outstanding compensation program as well as ample opportunity for continuing technical and career growth. Please send resume and salary requirements, in strictest confidence, to Ms. C. Prosser, Corporate Personnel Manager.



Computer Systems Analyst

To place efficient solutions of processes, big data and technical the state 198 with many techniques in developing the new and existing systems. The analyst will be responsible for developing, testing and maintaining systems, programming, debugging, and testing. The analyst will be responsible for developing, testing and maintaining systems, programming, debugging, and testing. The analyst will be responsible for developing, testing and maintaining systems, programming, debugging, and testing.

NUMERICAL TECHNICAL SUPPORT

Responsible for technical support of numerical analysis software. The analyst will be responsible for developing, testing and maintaining systems, programming, debugging, and testing. The analyst will be responsible for developing, testing and maintaining systems, programming, debugging, and testing.

DATA BASE CONSULTANT

Our client with various U.S. locations seeks exp'd. data base pro for rapidly growing software dev. org. Work on design, tech. consulting, or admin. Lg. data base systems (RDB, IMS, IDMS, ADABAS, etc.). Excel. growth opp., many extras. To \$47,000/yr.

ROBERT S. BIRCH
OF HARTFORD, INC.
111 Paul St.
Hartford, CT 06102
(203) 779-7170
Permanent Consultants

TECHNICAL SUPPORT MANAGER

Rapidly growing St. Louis Insurance Company seeks an individual with strong background (BA, MS, MBA) with DOVISE, COOL and VITAL. An experienced with the 4000 series, DLI, and VMI preferred. Excellent training, benefits, and working conditions. Above is required. Excellent company and growth potential. Please send resume and salary requirements by June 15 to:

P.O. Box 8077
St. Louis, MO 63108
Attn: Mark Kottke

Colorado Scientific Opportunities

Software, Micro 350,000
Computer Applications 22,000
Computer Design 22,000
Software O.A. 30,000
Hardware Design 30,000
Graphics Systems Develop. 30,000

For a free interview, send your resume to:

THE PRO FIRM
P.O. Box 834, Suite 2
Denver, Colorado 80202
(303) 555-8862

Careers

MANUFACTURING SYSTEMS

Fairchild Communications & Electronics Company is currently seeking experienced Data Processing professionals to join the Management Information Systems team in developing new manufacturing and financial applications. We are using MIMS, a fourth generation DMS and programming language facility for on-line, interactive application development.

We seek candidates with relevant BS/BA degrees, or equivalent, plus 3 or more years of experience designing and developing applications software including:

- Manufacturing Systems
- Quality Control
- Shop Floor Control
- MRP Systems
- Bills of Material
- Material Control
- Inventory
- Purchasing

Our IBM Data Center offers the opportunity to work with state-of-the-art hardware and software including:

- IBM 4341/R & 4351
- VM-SP-3 & OS/VS/VS-JES-2
- MIMS
- CICS/DMS-4/MG
- COBOL
- LIBRARIAN
- APL-DI
- VM/CMS
- IFS/ODS
- DYL-280

We offer competitive starting salaries and excellent company benefits that include paid life and health insurance plans, educational assistance, stock plan, retirement, etc. Please forward your resume, including salary requirements, to Professional Employment, Fairchild Industries, Mailstop A-24, 20301 Century Blvd., Germantown, MD 20874-1151, Dept. CW-14.



FAIRCHILD

INDUSTRIES
An Equal Opportunity Employer

Computerworld is covering the
National Computer Conference
in three issues:

NCC PREVIEW ISSUE

July 2, 1984

(Classified closing June 22, 1984)

NCC SHOW ISSUE

July 9, 1984

(Classified closing June 28, 1984)

NCC WRAP-UP ISSUE

July 16, 1984

(Classified closing July 6, 1984)

Here we get a tip for you! Do you need high quality job applicants or need to find buyers for your computer equipment. Our coverage of the National Computer Conference could be the answer to your problems. Again this year we have bonus distribution of Computerworld at the show. That bonus distribution means that over 500,000 readers will see your ad. Computerworld is offering you the chance to reach who you need to, along with giving you the insight to the happenings, speeches, and current news of the show. Information you should know!

Don't miss the opportunity of a lifetime.

For more information call or write:

COMPUTERWORLD

Classified Advertising

376 Conchuate Rd, Box 880

Framingham, MA 01701

800-343-6474

(617)-679-0700

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

COME IN FROM THE COLD SOUTHERN CALIFORNIA

Nearby sunny beaches, the old slopes of Mount Baldy, and the beauty of Lake Arrowhead. As an employer, the County of San Bernardino offers an aggressive, state-of-the-art data processing environment. In addition to affordable housing and low utilities, immediate openings exist for these positions:

PROGRAMMER ANALYST III: Up to \$38,000/yr (Depending upon qualifications)

PROJECT LEADER - DOES IT ALL. Directs systems development projects and staff from beginning to end including feasibility and cost benefit analysis, designing, programming, documenting and customer training. EXP: A minimum of 4 years total data processing experience including all of the following: COBOL/IMS programming, program specification writing, supervision of programmers, cost benefit analysis and systems design.

PROGRAMMER IV: Up to \$34,000/yr (Depending upon qualifications)

LEAD PROGRAMMER POSITION. Instructs and advises on programming techniques, assists Programmer Analysts in designing sophisticated systems and develops logic and codes for complicated systems. EXP: Four years OS/UCI/COBOL which included two years IMS. Priority consideration given to candidates with at least 1 year ADF experience. Job references mandatory.

This Data Processing Center supports the largest, fastest growing county in California. Our Management boasts of state-of-the-art work environment including: new, private, modular offices complete with CRTs for each employee; flexible work schedule; challenging assignments; team concepts; & a complete benefit package including substantial retirement benefits.

SOFTWARE: TSQ/SPF, PAN-VALET, ONLINE ADF/IMS-DB/DC, D/B DICTIONARY, etc., etc.

HARDWARE: 3061, 8100, IV-Phase, Data General, IBM-PC, etc.

CALL COLLECT: (714) 383-1061

Mr. Jean or Mr. Louder, 8 AM to 5 PM (PST)

An Equal Opportunity Employer m/f/h

SAUDI ARABIA

SYSOXEX INTERNATIONAL, a California corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia, has the following challenging position:

DP TRAINING SPECIALIST

Will present O/U data processing courses and programs to employees of the Saudi Arabian Department of Customs. Requirements: must have all of these: min. Bachelor's degree and 7 yrs. computer software experience; 2 yrs. teaching experience and 2 yrs. IBM 370 MVS/ESA/SA.

Besides teaching, will also be responsible for: preparation of data processing class, instructional materials and lesson plans; supervision of class learning, evaluation of class performance and registration control and distribution of course material. Bilingual (Arabic/English) highly desirable.

We offer an excellent benefit package including: medical, life, accident dental, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid education expenses, plus eligibility for present Federal Income Tax reductions.

Please send resume with present salary to Personnel CW-028, SYSOXEX INTERNATIONAL, INC. 10580 N. Tanager, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOXEX

Systems International Inc.



DIRECTOR, UNIVERSITY HOSPITAL INFORMATION SYSTEMS

400-Bed Oregon Health Sciences University Hospital seeks director, Hospital Information Systems. Requires at least 5 years experience as director of information systems, at least 3 years in health care in general. Must have bachelor's degree in business administration or computer sciences; MBA preferred. High institutional stability and participation in top management. Innovative program development. Excellent fringe benefits. Send resume and salary history to Director, University Hospital, 3181 S.W. Sam Jackson Park Road, Portland, Oregon 97201.

Affirmative Action, Equal Opportunity Employer

PROGRAMMER/ANALYST SYSTEM/20

Public Engineer's Personnel Association is seeking a Director, Information Systems, to present a report to the President. To meet the challenge of our program, we are seeking a motivated individual with a minimum of 5 years experience in the field of computer systems and a minimum of 3 years experience in the field of computer systems and a minimum of 3 years experience in the field of computer systems.

Working in an IBM System 38 under the direction of the President, the candidate will be responsible for the development and implementation of the information systems program. The candidate will be responsible for the development and implementation of the information systems program.

Please send your resume & salary history to: Director, Information Systems, 3181 S.W. Sam Jackson Park Road, Portland, Oregon 97201.

PUBLIC EMPLOYERS' RETIREMENT ASSOCIATION
OF CALIFORNIA
1200 Laguna Street
Denver, CO 80202
An Equal Opportunity Employer M/F

DIRECTOR MIS

Rapidly growing new VAX 750 installation is seeking a results-oriented person with a record of achievements in the areas of long/short range planning, budgeting and development and implementation of company wide information systems. Applicants should have a minimum of 10 years experience within the computer field, preferably with a heavy emphasis in the area of user relations. The candidate will also possess excellent management, technical and communication skills.

Familiarity with VAX 750/780 system software, Basic, Fortran and COBOL is preferred.

Located in the beautiful Green Mountains of Vermont, this position holds a special challenge for the right candidate.

Please submit resume and salary history to:

**Mr. H. Hall, Personnel Mgr.
Green Mt. Power Corp.
P.O. Box 880
S. Burlington, Vt. 05402**

Equal Opportunity Employer

HIRING?

More computer people
read Computerworld
than any other
newspaper in the
United States - more
than half a million
computer people every week.

And, among our
529,650 readers at
user organizations
about half claim to
look at recruitment
ads at least every
other week (only a
small percentage say
they never look at
recruitment ads).

No wonder Computerworld
carries more
recruitment ads for
computer people than
any other publication.
To place your ad or
to get a rate card
with complete details
on Computerworld
Classifieds,
call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
617-879-0700

ADMINISTRATIVE COMPUTING- TECHNICAL SERVICES MANAGER

Working supervisor for staff of a major university research center, manages personnel, administrative, and technical services. Requires a minimum of 5 years experience in administrative and technical services. Must have a minimum of 5 years experience in administrative and technical services. Must have a minimum of 5 years experience in administrative and technical services.

Medical Software Designer

Developing and programming software programs for medical and health care applications. Requires a minimum of 5 years experience in medical software design. Must have a minimum of 5 years experience in medical software design. Must have a minimum of 5 years experience in medical software design.

Technical Support Specialist

Providing technical support for computer systems. Requires a minimum of 5 years experience in technical support. Must have a minimum of 5 years experience in technical support. Must have a minimum of 5 years experience in technical support.

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

The Lawrence Livermore National Laboratory, a research and development facility located in the East Bay, currently is seeking experienced information systems analysts.

Senior Information Systems Analyst

In this position you will assist in the development of an integrated management information system for the Laboratory's Plant Engineering Department. The successful candidate should have prior experience in the development of information systems for a plant facilities organization, and general knowledge of HP 3000, UNIVAC 1100 and personal computers.

Information Systems Analyst

This position involves assisting in the development of new information systems for the Laboratory's Budget Office. General knowledge of WANG VS and UNIVAC 1100 computers, as well as personal computers running MS-DOS, and experience and knowledge of budget and planning systems is desired.

Both positions involve department-wide information systems project planning and control, analysis and design, and coordination of other project activities, which include programming, testing, user training, documentation and post-implementation review.

Candidates for these openings must have a BS degree in computer information systems or related field, or equivalent experience. A Master's degree preferred. We seek individuals with proven track records in the development of information systems, from feasibility study to post-implementation review. Technically, you must have specific knowledge and skills in the areas of Systems Development Methodologies, Project Management, Structured Analysis and Design, Data Base Concepts, and fourth generation tools and techniques. Additionally, applicants must have strong oral and written communication skills and the ability to interact effectively at all levels.

To apply for these positions, please send your resume, in confidence, to: Sue Purjes, Professional Recruitment, Lawrence Livermore National Laboratory, P.O. Box 8010, Dept. NCR-4714, Livermore, California 94550.

U.S. Citizenship required.

An equal opportunity employer m/f/h/v.

University of California
Lawrence Livermore
National Laboratory



RESEARCH INSTITUTE
UNIVERSITY OF PETROLEUM & MINERALS
DEHRADUN, SOUTH AFRICA

NEEDS

Systems Analyst/Programmer for the Administrative Management Systems. Micro-computer experience desirable. Minimum of three years experience required on administrative systems, plus BS degree. Knowledge of Arabic language helpful.

Salary is competitive. Benefits include annual repatriation, housing and transportation allowance.

Candidates possessing the above requirements, need only apply to the address listed below within one week of the release of this advertisement, furnishing detailed resume of educational qualifications and experience, attaching copies of degrees and transcripts, giving names and addresses of four referees, including present employer, if possible, and present position held.

University of Petroleum & Minerals
Recruitment Office
8716 Westbank, Suite 1500
Daguerre 207
Baton Rouge, Texas 77057

DIRECTOR OF SOFTWARE PRODUCTS

Why Be Satisfied With
A State-Of-The-Art
Position When ISI
Can Offer You This... + More!

This is an exceptional opportunity for that rare individual who has knowledge of computer science, micro and on-line systems, complemented by several years' experience in marketing, sales and product development. This position is directly responsible for the design, development, implementation and marketing of ISI's software products including Sci-Mate on a worldwide basis. Applicants should possess a BS in Computer Science (MBA a plus), or equivalent and at least 3 years' experience in marketing and product development for an advanced technology product or service.

ISI has been an international leader in the field of information science for over 25 years. Compensation package is fully commensurate with your education, experience, and potential. For immediate consideration, forward your resume with salary history and requirements to: Vice President, Human Resources.

isi

3001 Market Street
Philadelphia, PA 19104

Equal Opportunity Employer, M/F/H/V



In a bind?

Do you
need real
professionals?
Advertise in
Computerworld
to find
exactly who
you're looking for.
Because...

More computer people
read Computerworld
than any other
newspaper in the
United States—more
than half a million
computer people every
week. And, among our
529,650 readers
at user organizations,
about half claim to
look at recruitment ads
at least every other
week (only a small
percentage say they
never look at
recruitment ads).
No wonder
Computerworld
carries more
recruitment ads for
computer people than
any other publication.

To place your ad
or

to get a rate

Call or write:

Classified

Advertising

Computerworld
Box 880
Framingham, MA
01701

(817)879-0700
(800)343-8474

SOFTWARE PROFESSIONALS... FLORIDA LIVING IS A YEAR "ROUND EXPERIENCE... AND THE HIGH-TECH CLIMATE IS GOOD!

INTECH SYSTEMS has immediate Florida Suncoast opportunities to experienced Software Professionals with an interest in automated material handling systems, automated guided vehicles and robotics.

If you possess 3+ years of mini-computer experience (Data General a plus), you can't find a better place to develop tomorrow's technology today.

Our growth has been outstanding and our present and planned projects and systems are alive with high-tech sophistication, providing you with unequalled career stimulation and a high level of corporate visibility.

Located in Clearwater, Florida we can also offer the year "round" professional opportunities of the Suncoast. Please forward your resume, in confidence, to: Rob Greenwood, INTECH SYSTEMS, 15900 49th St. North, Clearwater, Florida 33520



**INTECH
SYSTEMS**
An Equal Opportunity Employer M/F/Hispanic/Asian

SALES POSITIONS

Project
Management Software

Rapidly growing established high tech firm seeks experienced sales executives to represent a line of mini-based management decision support products. Minimum of 3 years' experience in high tech, high ticket sales environment. Successful track record dealing with long term consultative sales cycles and government related contracts is preferred. Only superior people need apply.

Please call Kim Lambert at (417) 344-0800.



**Mitchell Management
Systems, Inc.**

Westborough Office Post
3000 West Park Drive
Westborough, MA 01581

| POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS |
|--|--|---|---|------------------------|
| <p>CONSULTANT 555-45355</p> <p>Develop your flexible, talented Manager nationally recognized consulting firm seeks experienced systems professionals to provide client services in programming, analysis and design jobs. 15 hours for this position, you must have 1 or more years of computer data processing experience with IBM, CDC or UNIVAC/1140/1150 hardware. Salary and benefits are commensurate with experience and qualifications. JN 1518.</p> <p>MARK DAVIS ROBERT HALF 1000 E. 10th Minneapolis, MN 55408 (612) 335-4551</p> | <p>APPLICATION DEVELOPER AND PROGRAMMING TECHNICIAN</p> <p>Position: One of the top computer software development and programming positions in the world. Responsibilities: Develop and program software for the world's leading computer manufacturers. Requirements: Bachelor's degree in Computer Science or equivalent. Experience in software development and programming. Salary: \$15,000 to \$20,000 per year. Benefits: Health, dental, life insurance, 401(k) plan. Location: Minneapolis, MN. Contact: Robert Half, 1000 E. 10th, Minneapolis, MN 55408. (612) 335-4551.</p> | <p>ASSISTANT DP MANAGER</p> <p>Minimum 3 years IBM System 36 RPG III online manufacturing systems experience plus 1-2 years in a managerial position. BS degree in Computer Science preferred. Send resume to Personnel Department, Pull Pneumatic, 4647 Southwest 39th Ave., Ocala, FL 32674.</p> | <p>Have you considered a career as a Consultant? When you join Tangent you will be exposed to numerous challenging assignments that will enrich your technical capabilities and allow for personal growth.</p> <p>As a substantial organization with offices in New York, Dallas, Orlando and nationwide business, our Consultants have an enviable reputation for excellence and of course, they have the added benefit of job security.</p> <p>We are looking for various levels of expertise, but all positions require practical programming experience and a minimum of 3 years commercial experience in one of the following:</p> <ul style="list-style-type: none"> • FOCUS • MIS DB/DC with either PL/I or COBOL (a plus) • IDMS, COBOL (ADSO a plus) • HP3000, COBOL, IMAGE, QUERY • ADABAS, CICS, COBOL <p>Tangent offers a competitive compensation package which includes:</p> <ul style="list-style-type: none"> • Excellent Rates of Pay: permanent salary or independent staff • Paid Relocation • Full Medical Benefits • 15-Days Paid Vacation <p>We are hiring now for assignments across the Nation...so phoning is your first step towards your career with Tangent.</p> <p>Call: PHIL CLARK, (212) 938-0438 or write to: TANGENT INTERNATIONAL COMPUTER CONSULTANTS, Inc. One World Trade Center, Suite 9007 New York, N.Y. 10048</p> | |

\$\$\$...\$\$\$...\$\$\$...\$\$\$...\$\$\$

Success in the Software World

Tangent

MANAGER/ INFORMATION SECURITY

Where is data/Information security of paramount importance? With the folks who do it right!

Resources Management Department. Primarily, you will implement, review and manage effective information security functions, including data protection, access authorization and usage monitoring. Specifically, you will be responsible for the development of policies and procedures essential to successful process, evaluation and selection of appropriate security systems software/hardware and providing guidance to all departments in proper computer usage.

We require a degree in Business and/or Computer Science and a minimum of 5 years' systems development experience in the areas of systems analysis, design, programming and installation. Your background should include extensive knowledge of data security software (preferably ACORN) and data dictionary and data base management systems (preferably ADABAS). You will be interfacing with various levels of management, which will require excellent organizational, technical writing and communications abilities.

We offer an excellent compensation program, which includes a competitive salary and comprehensive benefits program. For further information, please forward your resume, stating background, salary history and requirements, to: Mr. C. Brezian, Employment Specialist, Kentucky Fried Chicken, P.O. Box 32070, Department 9000, Louisville, KY 40232. An equal opportunity employer M/F.



SENIOR PROGRAMMER ANALYST 4-6 YEARS

Independent Oil & Gas Exploration company looking for the right person to lead programming team. Individual will work in a state-of-the-art environment utilizing DO MV/6000 and MV/4000, COBOL, 74, FORTRAN 77, AOS/VLS, and FOCB II. Development plus support of 800+ program on the accounting system. If interested in the deep south, send resume to:

OSP Manager
P.O. Box 6307
Lafayette, LA 70505

PROGRAMMER/ANALYST

Active has immediate openings in Sacramento, CA, San Jose, CA, and Palo Alto, CA, for computer professionals experienced in one of the following areas:

- (1) SAS PL/I (2 years minimum)
- (2) IBM COBOL, JCL, DB/DC or CICS
- (3) IBM COBOL, DB/DC, or CICS

We offer an attractive employment package with compensation from \$18,000.

Send resume in confidence to:

Active Computer Services
P.O. Box 611
Perrysburg, OH 43067
Or Call (614) 399-0555

Interested candidates are urged to call.

EOE M/F/DFW

CONTROL DATA CORPORATION

NEW PROGRAM FOR BAPTIST

RESEARCH FACILITY

A select number of applicants will be invited to participate in a research project.

1. Computer-based instruction systems to be designed and developed.

2. Computer-based instruction systems to be designed and developed.

3. Computer-based instruction systems to be designed and developed.

4. Computer-based instruction systems to be designed and developed.

5. Computer-based instruction systems to be designed and developed.

6. Computer-based instruction systems to be designed and developed.

7. Computer-based instruction systems to be designed and developed.

8. Computer-based instruction systems to be designed and developed.

9. Computer-based instruction systems to be designed and developed.

10. Computer-based instruction systems to be designed and developed.

Date Processing

IDMS DBA

California Casualty is preparing for client computing under IDMSR, CICS/DBS and IDMS DBS software. This direction requires a qualified DB professional to join our MIS Department in San Mateo.

In this position, you will be working with a Senior DBA in planning for and implementing IDMSR related software. You will also support and enhance existing network databases, design and implement new operational databases, generate CV's, prepare standards and procedures and support ADSO programming.

For this position, we are seeking an individual with 4-6 years' DB experience and 1-2 years' working in an IDMS DB capacity. Experience with IBM mainframe equipment and a working knowledge of COBOL, IDMS and ADSO are essential. Qualified candidates will possess excellent written and verbal communication skills and have an ability to take initiative independently as well as to work closely with MIS and non-MIS personnel.

For immediate, confidential consideration, please forward your resume with salary history to:



**California Casualty
Management Co.**

P.O. Box M
San Mateo, CA 94402
Attn: Peggy Gill
Personnel Dept.

An equal opportunity employer

VIRGINIA

"IMS"

Live in Historic Richmond! Work on special projects using IBM IMS/DC. Train staff. Experience in a large IMS shop preferred. Excellent opportunity to grow into a Database Administrator position. \$20K.

ROBERT HALF

OF VIRGINIA, INC.
230 Main Street, Suite 1212
Richmond, VA 23219
(800) 441-3677

FLORIDA CONNECTION

RECRUITMENT

Start Date: Planning
Self-paced position. New day every week. 1-2 yrs. IBM COBOL and one of the following: DB/DC, CICS, FORTRAN, PL/I, or JCL. Salary: \$18,000 to \$20,000 per year. Benefits: Health, dental, life insurance, 401(k) plan. Location: Jacksonville, FL. Contact: Robert Half, 1000 E. 10th, Minneapolis, MN 55408. (612) 335-4551.

Any one of the following: DB/DC, CICS, FORTRAN, PL/I, or JCL.

Send resume to: P.O. Box 6307, Lafayette, LA 70505.

EOE M/F/DFW

DALLAS

IBM DB/DC

PROG-ANALYST

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

INSTRUCTOR DATA PROCESSING

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

RESEARCH FACILITY

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

amdahl

The Brilliant Technology

A true phenomenon occurs when brilliant engineering minds meet the challenge of a technological society.

It's happening at Amdahl Communications Systems Division, where we design and manufacture high performance digital data communications networks.

Systems Engineers

You'll apply your thorough knowledge of data communications networks to our expanding sales efforts. We have entry level positions through senior level, and require a minimum of 2 years experience. Based on your experience in the field, which includes handling project management on large accounts, you'll provide pre- and post-sales technical support to our sales team and customers.

Amdahl Communications Systems Division offers the kind of benefits that you would expect from an industry leader. Included are top-notch salaries, company-paid insurance, and stock purchase and savings plans. Become a part of the Amdahl Phenomenon by making your resume, in confidence, to: G. Payne, 2500 Walnut Avenue, Dept. CW 5/28, Marina del Rey, CA 90291. We are an Equal Opportunity Employer.

the amdahl phenomenon



VAX 11/780 PROGRAMMER ANALYST

Bechtel Power Corporation's project at the Limerick Generating Station in Pottstown, Pennsylvania, just 40 miles northwest of Philadelphia, has a current opening for a Programmer Analyst.

We require a minimum of 3 years' experience in programming, utilizing FORTRAN. Experience in other languages, computer graphics and telegraph VAX systems is desirable.

For consideration, please send a resume to:

Don McChesne
Bechtel
Employment Dept. 64D-1
P.O. Box A, Seneca Place
Pottstown, PA 17664



MANAGER DATA ADMINISTRATION

IBM/DBS

Fortune 500 totally computerized company is ready to hire successful manager to provide strategic database plan and staff direction. Our exceptional in data management/finance administration qualifies you. Please call for immediate consideration.

RAY WHITE
ROBERT HOLF OF
DAYTON
P.O. Box 798
MERCY STREET
Dayton, Ohio 45408
512-554-6665

RESEARCH PROGRAMMER/ANALYST

15-month position of University level. Duties include supervising lower grade programmer/analysts, managing program and laboratory activities, and planning in management research and technical training. Position requires a Ph.D. in Computer Science or related field. Salary range \$15,000 to \$25,000. For consideration, send resume to: Director of Human Resources, 1100 East Georgia Avenue, Room 1111, St. Louis, MO 63103. Equal Opportunity Employer.

PROGRAMMER/ANALYST

This Recruitment Has Been Re-opened

This position opens with the College of St. Joseph and St. John's University. Responsibilities include: design and development of programs for a DEC PDP 11/70, and the design, planning and implementation of systems design in relation to Academic Computing capabilities. Bachelor's degree in Computer Science or related field including course work in one or more of the following: Programming, Mathematics, Physics, CS, CS/MS/BS, Systems Languages, Computer Systems, and related fields. Position is located in the College of St. Joseph and St. John's University, Collegeville, PA 17017. For consideration, send resume to: Director of Human Resources, 1100 East Georgia Avenue, Room 1111, St. Louis, MO 63103. Equal Opportunity Employer.

HP 3000/1000 ALL FEE PAID NC, SC, VA, GA

If you have HEWLETT-PACKARD experience, and are seeking professional, immediate move to further your career path, call TODAY. I am representing 16 clients with opportunities ranging from programmer analyst to systems analyst with salaries of \$65,000-\$85,000. Call the HP Specialist.

DAVID MORGAN, C.A.P.
PERSONNEL PLACEMENT, INC.
P.O. BOX 910
HARRISBURG, NC 27533-9110
(716) 894-8991

SYSTEM DESIGN BEGINS AND ENDS WITH PEOPLE.

YOU CAN CALL US NOW OR YOU CAN CALL US LATER.

CompuSearch, a division of Management Recruiters, specializes in finding data processing people with the training and experience to step right into your DP staff positions and start producing —

right now.

Don't be frustrated by staff vacancies or expansion needs. Call CompuSearch today! We'll find, screen and deliver the qualified people you need.

| | | | | | |
|----------------|------------|----------------|------------|----------------|------------|
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138-264 |
| Anniston | 30-138-264 | Anniston | 30-138-264 | Anniston | 30-138-264 |
| Mobile | 30-138-264 | Mobile | 30-138-264 | Mobile | 30-138-264 |
| ALABAMA | 30-138-264 | ALABAMA | 30-138-264 | ALABAMA | 30-138 |

BUY - SELL - SWAP



One-stop computer leasing.

The Total Computer Company...

Available at
IBM Dealers

IBM Dealers

Hartford Computer Group



800-323-6355

or 312-364-0505

1 X 6 STC 3650

Tape Drive

6250/1600

\$40,000

Available 6/1/84

Contact Dan Jones

or Gene Bering

(213) 390-6261

FOR SALE:

SYSTEM/34 & 5211

300 LPM printer,

F34-256MB, 128K

magazine, 2500

Communications Adapter,

3701 EIA Interface, 4703

Internal Clocking, 1110 &

5611 printer attachments.

\$25,000 or best offer.

Contact Faith Ferrero

404-256-8550

BUYING?

Whether you're looking for big computers, little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474
(or 617-879-0700)

for more information

| | | |
|--|--|---|
| FRONTIER COMMUNICATIONS CORPORATION Your Full Service Computer Dealer | | |
| DPD MAIN FRAMES PERIPHERALS COMMUNICATIONS — Call — FRED HANSEN | S/34 S/36 S/38 & RELATED PERIPHERALS — Call — RICHARD LORANG | |
| DALLAS: 214-330-7243 • HOUSTON: 713-550-7356 OUTSIDE TEXAS TOLL FREE 800-527-6438 4872 South Westwood Dallas, Texas 75227 | | 3270's 3277 • 3278 3274 • 3276 3271 • 3272 — Call — TERRY SMITH |

| | |
|--|--|
| IBM SERIES/1 S/34 • S/36 • S/38 • 4300 S/10-S/20 • S/32 BUY • SELL • LEASE All models, systems & peripherals AVAILABLE NOW! Ask about our 72 hour upgrade! | |
| (408) 425-7333 SOURCE DATA PRODUCTS, INC. 10000 10000 | |

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

DIGITAL'S TRADING!

RA81: \$12,000/TU78: \$38,000*

Why settle for yesterday's storage technology when you can have today's...affordably! Take advantage of Digital's TRADE-UP Program. Trade in your RM05 toward an RA81 fixed disk drive, or your TU77 toward a TU78 mag tape drive.

The RA81 offers 456 megabytes per drive...at the best cost per megabyte you'll find. And you can install up to three drives in one cab...no change in footprint.

With its 140 megabyte reel, the TU78 is a perfect companion to the RA81 for high-speed volume back-up. And at 6250 bpi recording density, its 2400-foot tape holds as much data as four TU77 tapes.

Interested? Try a trade. Benefit three ways: lower cost of ownership, higher performance, and greater reliability. For the details, call Digital's Add-on Consulting Center, 800-343-4040, ext. 697 (in New Hampshire, 884-7990, ext. 697).

*With your Digital-maintained RM05-AA or TU77-FB in trade. Delivery and trade-in credit subject to change without written notice.

digital

*Digital System Company, Inc.

Check us out for DEC

11UX44 \$23,000 □ RL02-AK \$2,300 □ 11V23 Amy Contig.
VAX 750 \$43,000 □ VAX 780 \$131,000

All immediate and guaranteed. Everything from 11V03 to VAX

DATWARE SYSTEMS LEASE

800-221-6318 20 Bay St. S.I. NY 10020 (212) 447-4911
TELEX 438504/TWVX 70886-4738

D
C
R

WHEN YOU'RE READY

TO BUY • SELL • TRADE • LEASE

DEC **VAX-UBUS-QBUS**
TERMINALS

CALL OR WRITE

DIGITAL COMPUTER RESALE

400 KIRKHOFF • C-22
HOUSTON, TX 77076

713/445-0082

NCC 1984

The National Computer Conference is the biggest and most important conference in the world and it is going to be held July 9-12, in Las Vegas, Nevada this year! The NCC issues will have a readership of over 500,000 readers. This could be one of your smartest advertising moves of the year. Computerworld is giving you the opportunity to reach the show's attendees with three issues:

PREVIEW - July 2nd
SHOW - July 9th
WRAP-UP - July 16th

Our open rate is \$9.15 per line and the minimum ad size is 2 column inches (1 column x 2" at a price of \$256.20). We are \$128.10 per column inch. Send us camera-ready copy (negative or video) or copy to be typeset by us at no extra charge. Enclose any logos, artwork, or borders that you want to use in your ad. We also have a team of ad takers that will accept simple copy over the telephone.

For more information call or write:

COMPUTERWORLD
Classified Advertising
375 Cochituate Road
Box 880
Framingham, MA 01701

(617)879-0700
(800)343-6474

Telecopiers: 410 451

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.



Pearl Computer Division

410 E. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202. (615) 383-8703

IBM UNIT RECORD EQUIPMENT



SALE OR LEASE

IBM UNIT RECORD MACHINES

025-029-082-083-084
085-087-088-129-514
518-548-557

NEW & USED

DISK PACKS—DATA MODULES

2316-3336(1)-3336(11)-3346(7)

MAG. TAPE-SHRETTES

Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

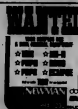
VAX SYSTEM
TOTALLY INTEGRATED

80 Characters Per Second
Letter Quality Parallel Printer
\$1,899

5200 TH Density Drive
VAX Formatter And Cabinet
\$58,899

MANHATTAN
SYSTEMS

5880 Hiram, Suite 5A
Denver, CO 80229
303-373-4330



DEPOT REPAIR
IBM 5251, 5291

CRT Assembly and
Plaster Boards

For Details Call:
(616) 882-8141
Russell Sullivan

Computech

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

SYSTEMS

4341 4331
38 36 34
32 3

BUY • SELL • LEASE
COMPUTER
BROKERS, INC.
2878 WILLEY ST.
MEMPHIS, TENNESSEE



TOLL-FREE

800-338-8406

801-372-3822

PERIPHERALS

3203 3370

327X 3411

3350 3420



IBM

SYSTEM/34

S/3 • S/32 • S/38

5291 • 5251

3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK



210 SPACE PARK NORTH
P.O. BOX 248
BIRMINGHAM (NASHVILLE)
TENNESSEE 37077

800-422-1004

IN TENNESSEE CALL (615) 858-3872

COMDISCO

A Commitment
To Excellence

IBM PROCESSORS

IBM PERIPHERALS

3081

3350

3083

3880 1

3033

3380 AA-1 B1

4341

3370 3375

4341 4381

3803-2

3420 4 6

4381

3705 3706

4331 2 4361

3725

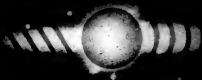
3178 3278

And in

3890

3800 3211 320

The Leader In Full-Service Leasing



BUY-SELL-LEASE

SERIES-1

S/34 • S/36 • S/38

4300

S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM

1000 N. 7TH ST. - MINNEAPOLIS, MN 55415

CALL TOLL FREE

800-328-7723

3375's

A1, B1, B1, D1
Available 8/1-8/4
Retail/Lease

PRINTERS • 4045 • 3000 • 3000 • 3211 • 1400 • 3000 • 3000 • 3007 • 3000

COMPUTERS

3800 3274

3803 3276

3278 3178

3278 3277

4341's

4341's
4381's
Retail/Lease

DASD

3360 3375

3370 3360

3344 3310

Immediate Delivery

Control Units

3880 • B13
3880 • D13
Avail. July 84
Retail/Lease

TAPE DRIVERS

3420 3430

3410 8809

Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment



Computer Marketing Inc.

9710 VENTNOR AVENUE
MARGATE, NJ 08402-2223
609/823-6000 • 800/345-0005

Contact/Dennis Gent

CDR

BUY — SELL — LEASE

SYS/34 SYS/36

- IMMEDIATE DELIVERY
- GUARANTEED M/A
- SHORT TERM RENTALS
- PERIPHERALS
- FEATURES-UPGRADES



MARION

84 KENNEDY STREET
HACKENSACK, N.J. 07602

(201) 343-4554

(203) 758-2489

(412) 864-8811

BUY SELL SHAP

BUY SELL SHAP

BUY SELL SHAP

BUY SELL SHAP

BUY SELL SHAP



TEN REASONS WHY FORTUNE 500 COMPANIES LEASE FROM RANDOLPH.

1 FINANCIAL STABILITY. As an important part of the Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

2 19 YEARS IN THE BUSINESS. Randolph has been serving Fortune 500 companies since 1965... a history that gives added assurance that we'll continue as a leader in the industry.

3 HIGH-TECH LEASING IS OUR ONLY BUSINESS. Leasing computers is a lot different than leasing boxcars. Computer technology changes almost daily and with it the value of the equipment. Randolph not only keeps current on the state of the art but has learned to anticipate important changes.

4 ACTIVE REMARKETING DIVISION. Our unique customer support assures maximum return on investments in computer equipment which is no longer in use.

5 UNIQUE SERVICE. In addition to the manufacturer's service, Randolph has a technical staff that is on call to help reconfigure systems to meet the changing requirements of large companies.

6 COAST-TO-COAST RANDOLPH. Even though large companies may have computer sites all over the country, Randolph is right there to serve them. We presently have customers in over 300 cities and towns from Maine to Hawaii.

7 WE SPECIALIZE IN SOLVING PROBLEMS. Large companies can have a variety of problems... like machines installed on a rental basis, being stuck with a lease on an old machine or long waits for delivery. Whatever the problem, we can tailor a lease that will fit the need.

8 WE ARE DP PROFESSIONALS. At Randolph, our people have an average of 18 years in the DP industry... from 360's to 3084's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

9 WE GO BEYOND COMPUTERS. Randolph has been dealing with peripherals from the very beginning. Now we're involved in leasing communications systems and office automation equipment because that's what Fortune 500 companies demand.

10 WE SAVE THEM MONEY... LOTS OF MONEY. Randolph has been saving its customers 30% to 70% of their DP hardware dollars. Fortune 500 companies know leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

HOW ABOUT YOU? What we've done for so many of the Fortune 500 companies we can do for you. Call Joseph B. Kelly, Jr., Executive Vice President, 888-343-5382.
537 Steamboat Road
Greenwich, Connecticut 06830
203-681-4200 • 800-343-5307

Randolph



THE FIRST NATIONAL BANK OF BOSTON
BANK OF BOSTON

A MEMBER OF COMPUTER DEALERS & LEASING ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of

100% CENTUM

1901 Powers Ferry Road, Suite 110, Marietta, Georgia 30067
(404) 963-8895

FOR: Series/1

S/34 • S/36 • S/38
O.P.D. PERIPHERALS
BUY • SELL • LEASE
• TRADE

Supplies
DISK PACKS
RIBBONS ALL TYPES
TAPE
DISKETTES
EDP FURNITURE

CALL TOLL • 800-241-5284 • FREE CATALOG

DATA GENERAL

Hanson Data Systems

DSI

WE BUY
SELL &
LEASE!

BURROUGHS

Discover the
DSI alternative.

800-641-5215

All equipment available
immediately and guaranteed
for Burroughs Maintenance

DSI serving the Burroughs
Company World Headquarters
3480 W. Alameda Ave., Denver, CO
80231 (303) 927-8333
TWX 910-921-0443

You can get information
on buying or leasing

IRM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.

In Texas call 817/266-0023.

Up to 50% Savings

LPI

LEAS PAK INTERNATIONAL

P.O. Box 770 • Hous., TX 76051 • 817/266-0023

Send for our free products and services brochure:

Name _____

Address _____

City _____ State _____ Zip _____

Please _____



BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

CMI

AMERICA'S LEADING
SPECIALIST SERVING
THE USED MARKET

Albany, NJ (908) 845-7282
Boston, MA (617) 567-0738
Chicago, IL (312) 665-0739
Dallas, TX (214) 388-0888
Denver, CO (303) 758-0113
Houston, TX (713) 758-3443
Lakewood, CO (303) 445-8333
Miami, FL (305) 445-2388
Newport Beach, CA (714) 782-0443
Orange, FL (407) 272-3333
Plymouth, Michigan: Tel.: 416-861-1000
Stamford, Conn.: Tel.: 203-351-1121
Tampa, FL: Tel.: 813-272-3333
Toronto, Ontario: Tel.: 416-593-3888
Vancouver, B.C.: Tel.: 604-682-4198
Windsor, Ontario: Tel.: 519-973-3810

CMI FINANCIAL SERVICES GROUP
2000 Telegraph Rd., P.O. Box 2000
Stamford, Conn. 06907-2000
(203) 351-1121



A Torchmark Company

2000 Telegraph Rd., P.O. Box 2000
Stamford, Conn. 06907-2000
TWX/TELEX: 616-232-1087 CMI CORP. TMH
(313) 456-0000

3061-D16
Sale or Lease

3081-K24
Sale or Lease

For Sale/Lease
4381
1st Quarter Delivery

3033
All Models

New
Series 1
with
Basic Operating System
"Link" to the Series 1
IBM Model 900
100 Thousands of IBM Transactions

3378's
Available Now
2000, 2075, 2080
For Sale or Lease

3690-A6
Available Now
4700
Special Discount
Buy/Sell/Lease

3725
Lease Financing Available
For Your System or One
2, 4 or 5 Year Terms

3880
LEASE FINANCING
Model 1's Immediate Delivery
Model 2's Lease Financing
Available Any Term
2000-4 2011-4 2011-4
2011-4 2011-4

Tapes
Immediate Delivery
3063-3020
Buy/Sell/Lease

For Sale/Lease
4341-1
4341-2
Call Now

3270, 3270
3277, 3270
Terminals
All Models
Immediate Availability

3705-3704
Available for
Immediate Delivery
Sale or Lease

SYSTEM 38
Model 1's & 2's Available Now
New - Used
SYSTEM 38
S, L, & 4 or 5 Year Terms
Lease rates from 0.00
6120's
Available Now - Sale or Lease

Series 1 10
All IBM Configurations
Any Used Configuration
CSC/IBM/IBM/IBM/IBM
Type Sales up to 2000.00
CSC/IBM/IBM/IBM/IBM
IBM/IBM/IBM/IBM/IBM

SERIES 1 4070 CRT'S FEATURES — PERIPHERALS

LARGE USER HAS COMMISSIONED NATIONAL
COMPUTER EXCHANGE TO SELL MULTI-MILLION
DOLLAR INVENTORY OF IBM SERIES 1 EQUIP-
MENT. HUNDREDS OF CPU'S, FEATURES, ATTACH-
MENTS AND CRT'S. WILL CONFIGURE TO YOUR
NEEDS. EQUIPMENT REFURBISHED AND GUAR-
ANTEED ELIGIBLE.

CALL THE SERIES 1
HOT LINE
800-624-8299



OPTIONAL COMPUTER
EXCHANGE



600 North Lunar Avenue • Brea, CA 92621
(IN CALIF.) 714-980-5888 TWX: 910-596-1409

FORSYTHE MCARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals

FOUNDED 1971

Head Office
Stockholm
7500 Franchise Road
Stockholm, Sweden 16077
312 475-8000

Branch Office
Atlanta 404 450-9627
Detroit 313 540-0000
Minneapolis 612 476-0044

GMW

ATTENTION TO DETAIL.

All of Our IBM Equipment is
Tested/Refurbished/Rebuilt/Revised

SERIES 1 & New/Used
ENV and CDC
SYSTEM 34 @ Immediate
Upgrades:
SYSTEM 38 @ All Related
Peripherals:
SYSTEM 36 @ Trade In
Your System 34 Operating
Leases:
4300 @ Tape, Disk, Host
IO in Stock:
5110 @ 5203's & 5120's in
Stock:
P.O.S. @ 5205's a Specialty.
Upgrades/Downgrades,
Short Term Leases:
3600/4700 @ Banking

X XERXES
COMPUTER
SALES

1614 Harmon Place
Hempstead, NY 11540
908/330-3884, 618/330-3842

Perkin-Elmer
3230 System
\$78,950.00

4 Mb Memory,
2 CDC 675 Mb Drives
800/1600 Tape Drive,
600 LPM Printer
4 P-E 1251 Terminals,
All Controllers,
8 Line Mux
Price Does Not Include
System Software

Other Systems, Parts &
Peripherals At Similar
Low Clearance Prices
Call: Jim Wilson
(714) 730-6250 x1 264



Why Worry?

Let DANA Do Your Sweating!
For All Your IBM Buy/Sell/Leasing Needs

DPD

| CPU | DISK | TAPE | GPU | PRINTER | TERMINAL |
|------|------|------|------|---------|----------|
| 4341 | 3380 | 3430 | 5/34 | 3011 | 3251 |
| 4351 | 3375 | 3005 | 5/36 | 3262 | 3291 |
| 3081 | 3370 | | 6/38 | 3224 | |
| 3085 | 3350 | | | 3225 | |

Authorized dealer for GBT* and Decision Data* Products
Processors and CRT's plus compatible to S/36, S/38, S/38



DANA
MARKETING, INC.

800 433-4148

In California call 213 572-8845
Connecticut office 203 359-8040

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

SYSTEM/34 SYSTEM/36 SYSTEM/38 SERIES/1



FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

SEMI-CONDUCTOR SALES, INC.
540 CROSSOVERLANE • P.O. BOX 10007 • NASHVILLE, TENNESSEE 37204 • 615-767-9708

ECONOCOM

• BUYS • SELLS • LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE
- MAINTENANCE GUARANTEE
- NEW OR USED

CALL TOLL FREE
800-238-3098

SEMI-CONDUCTOR SALES, INC.

NPA
"Log on with NPA, we cover it all!"
Cost to Cost!
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE, SALE, TRADE,
LEASE, RENT
AND SERVICE OF

**Data General
EQUIPMENT**



Minimum of 3 days to 100 equipment ready for shipment anywhere from either coast

FOR COMPLETE INFORMATION CALL:
NEW YORK: 516-487-2800
COLUMBIA: 615-630-8353
NORTH CAROLINA: 704-487-2800



FOR LEASE IBM 3178-C3 TERMINALS

\$80.00/MO. INCLUDING
MAINTENANCE
KNOXVILLE COMPUTER
CENTER
CALL RAY HAYES
615-637-3330

IBM
3270

Want to Buy
5291, 5251, 5256
IBM Planner
Boards
\$100 each

For Details Call
(615) 692-9141
Russell Sullivan

Computech

FOR SALE

2 excellent condition PERIPHON-
ICS TCOM80 Communications
Processors featuring 16Kb Memo-
ry, real-time clock and solid state
logic. Available in June. Call Don
Sparks at

WD

WESTERN DIGITAL SYSTEMS
P.O. Box 1328
Austin, TX 78705
(800) 373-6601

FOR SALE NEW UDS Desktop Modems

304C MODEMS \$895 Each
2084B MODEMS \$945.00 Each

NETWORK NOW
CITY DISCOUNTS AVAILABLE
Call or Write Clark Bank
Care Building Services
1410 South Street
New York, NY 10111
(212) 661-1000 or Call
(212) 661-1000
8/84 Upgrade Deal Also

IBM Displaywriters

FOR DEC CALL SCHERERS

11/23-BE 11/23+ 512 KB
BRAND NEW 40% OFF \$3,995.
(614) 889-0810

THANKS TO YOUR CONTINUING SUPPORT, WE'RE STILL GROWING!

CALL US FOR ALL YOUR EQUIPMENT NEEDS

- BUY • SELL • LEASE
- ☐ CRTS ☐ DISK DRIVES ☐ TAPE DRIVES
 - ☐ MAINFRAMES ☐ PRINTERS ☐ PCs

All equipment eligible for manufacturer's M.A.
PHONE 214/288-0411

Metropolis Computer Company, Inc.

120 Dallas Drive, Suite 100 • Irving, Texas 75039 • TEL. 75-9774

Your Best Computer Connection

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE FOR SALE
- SOFTWARE WANTED
- TIME & SERVICES
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call our advertisers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday,
6 working days prior to issue date.

Rates: Open rate is \$128.10 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs \$258.20 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

- 1 col x 4" - \$124.40
- 2 cols x 4" - \$1024.80
- 2 cols x 5" - \$1281.00
- 2 cols x 8" - \$2048.60

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, \$15.00 per insertion.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

- Boston - (617) 879-0700 or (800) 343-6474
- New York - (201) 967-1390
- Chicago - (312) 827-4433
- San Francisco - (415) 421-7330
- Los Angeles - (714) 558-8480
- Atlanta - (804) 364-0758
- TELECOPIER SERVICE - (617) 879-0700 or (800) 343-6474 ext. 410 or 451

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT TRUST IBM EQUIPMENT FROM TEXCOM... THE IBM SPECIALIST

SERIES I

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1331 1311 • 1361 1381

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

| | | | |
|------|------|------|------|
| 3403 | 3380 | 3350 | 3211 |
| 3420 | 3680 | 3370 | 3811 |
| 3375 | 3340 | 3203 | 3262 |

IBM S 34 - 36 - 38

- All upgrades available now
- One, two, three year leases
- We'll take S/34 trade-ins
- All models and peripherals

WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR
AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9986
MEMPHIS (901) 784-7055
HOUSTON (713) 890-8714



Buy - Sell - Lease

S/34
S/36
S/38

IBM

3741
3742

CP/1, CP/1, PRINTERS
ALL MODELS

PURCHASE LEASAGE
SHORT & LONG TERM LEASES
Computer Marketing
of America, Inc.
P.O. Box 71
630 Bryson Street
Old Hickory, Tennessee 37138



1-800-251-2670

In Tennessee: 615-467-4831

ceres announces

- New 3370's Immediately Available
- System 36, 4381 Operating Leases
- All Peripherals Immediately Available
- System 34 Upgrades, 72 hr. Notice

NEW YORK — (212) 278-4467
HOUSTON — (713) 827-7117



IBM

AT A SAVINGS!

34
SYSTEM
38

SYSTEM
36

Contact Datacomp
and find out how much
you can save...
Call us now
800/323-3289

datacomp leasing
& service group

Compare
Before You
Lease

Chicago 312/323-1200
New York 201/463-3009
Los Angeles 714/671-5611

IBM A-1 Dun & Bradstreet
rating @ 2500 Satisfied
Customers @ IBM know-
ledgeable professionals
@ Satisfaction Guaranteed

C.D. SMITH &
ASSOCIATES, INC.

DEC computer systems & options
13805 Glen Freeway, Suite 518
Houston, Texas 77015
(713) 461-5112
TELEX 78-2647

DEC

WE ARE SELLING:
VAX 11/750, 11/760, 11/780
& MOST VAX OPTIONS

ALSO:
PDP-11A, 11/700, PDP-11A, 11/700
PDP-11C, 11/700, PDP-11C, 11/700
PDP-11D, 11/700, PDP-11D, 11/700
PDP-11E, 11/700, PDP-11E, 11/700
PDP-11F, 11/700, PDP-11F, 11/700
PDP-11G, 11/700, PDP-11G, 11/700
PDP-11H, 11/700, PDP-11H, 11/700
PDP-11I, 11/700, PDP-11I, 11/700
PDP-11J, 11/700, PDP-11J, 11/700
PDP-11K, 11/700, PDP-11K, 11/700
PDP-11L, 11/700, PDP-11L, 11/700
PDP-11M, 11/700, PDP-11M, 11/700
PDP-11N, 11/700, PDP-11N, 11/700
PDP-11O, 11/700, PDP-11O, 11/700
PDP-11P, 11/700, PDP-11P, 11/700
PDP-11Q, 11/700, PDP-11Q, 11/700
PDP-11R, 11/700, PDP-11R, 11/700
PDP-11S, 11/700, PDP-11S, 11/700
PDP-11T, 11/700, PDP-11T, 11/700
PDP-11U, 11/700, PDP-11U, 11/700
PDP-11V, 11/700, PDP-11V, 11/700
PDP-11W, 11/700, PDP-11W, 11/700
PDP-11X, 11/700, PDP-11X, 11/700
PDP-11Y, 11/700, PDP-11Y, 11/700
PDP-11Z, 11/700, PDP-11Z, 11/700
PDP-11AA, 11/700, PDP-11AA, 11/700
PDP-11AB, 11/700, PDP-11AB, 11/700
PDP-11AC, 11/700, PDP-11AC, 11/700
PDP-11AD, 11/700, PDP-11AD, 11/700
PDP-11AE, 11/700, PDP-11AE, 11/700
PDP-11AF, 11/700, PDP-11AF, 11/700
PDP-11AG, 11/700, PDP-11AG, 11/700
PDP-11AH, 11/700, PDP-11AH, 11/700
PDP-11AI, 11/700, PDP-11AI, 11/700
PDP-11AJ, 11/700, PDP-11AJ, 11/700
PDP-11AK, 11/700, PDP-11AK, 11/700
PDP-11AL, 11/700, PDP-11AL, 11/700
PDP-11AM, 11/700, PDP-11AM, 11/700
PDP-11AN, 11/700, PDP-11AN, 11/700
PDP-11AO, 11/700, PDP-11AO, 11/700
PDP-11AP, 11/700, PDP-11AP, 11/700
PDP-11AQ, 11/700, PDP-11AQ, 11/700
PDP-11AR, 11/700, PDP-11AR, 11/700
PDP-11AS, 11/700, PDP-11AS, 11/700
PDP-11AT, 11/700, PDP-11AT, 11/700
PDP-11AU, 11/700, PDP-11AU, 11/700
PDP-11AV, 11/700, PDP-11AV, 11/700
PDP-11AW, 11/700, PDP-11AW, 11/700
PDP-11AX, 11/700, PDP-11AX, 11/700
PDP-11AY, 11/700, PDP-11AY, 11/700
PDP-11AZ, 11/700, PDP-11AZ, 11/700
PDP-11BA, 11/700, PDP-11BA, 11/700
PDP-11BB, 11/700, PDP-11BB, 11/700
PDP-11BC, 11/700, PDP-11BC, 11/700
PDP-11BD, 11/700, PDP-11BD, 11/700
PDP-11BE, 11/700, PDP-11BE, 11/700
PDP-11BF, 11/700, PDP-11BF, 11/700
PDP-11BG, 11/700, PDP-11BG, 11/700
PDP-11BH, 11/700, PDP-11BH, 11/700
PDP-11BI, 11/700, PDP-11BI, 11/700
PDP-11BJ, 11/700, PDP-11BJ, 11/700
PDP-11BK, 11/700, PDP-11BK, 11/700
PDP-11BL, 11/700, PDP-11BL, 11/700
PDP-11BM, 11/700, PDP-11BM, 11/700
PDP-11BN, 11/700, PDP-11BN, 11/700
PDP-11BO, 11/700, PDP-11BO, 11/700
PDP-11BP, 11/700, PDP-11BP, 11/700
PDP-11BQ, 11/700, PDP-11BQ, 11/700
PDP-11BR, 11/700, PDP-11BR, 11/700
PDP-11BS, 11/700, PDP-11BS, 11/700
PDP-11BT, 11/700, PDP-11BT, 11/700
PDP-11BU, 11/700, PDP-11BU, 11/700
PDP-11BV, 11/700, PDP-11BV, 11/700
PDP-11BW, 11/700, PDP-11BW, 11/700
PDP-11BX, 11/700, PDP-11BX, 11/700
PDP-11BY, 11/700, PDP-11BY, 11/700
PDP-11BZ, 11/700, PDP-11BZ, 11/700
PDP-11CA, 11/700, PDP-11CA, 11/700
PDP-11CB, 11/700, PDP-11CB, 11/700
PDP-11CC, 11/700, PDP-11CC, 11/700
PDP-11CD, 11/700, PDP-11CD, 11/700
PDP-11CE, 11/700, PDP-11CE, 11/700
PDP-11CF, 11/700, PDP-11CF, 11/700
PDP-11CG, 11/700, PDP-11CG, 11/700
PDP-11CH, 11/700, PDP-11CH, 11/700
PDP-11CI, 11/700, PDP-11CI, 11/700
PDP-11CJ, 11/700, PDP-11CJ, 11/700
PDP-11CK, 11/700, PDP-11CK, 11/700
PDP-11CL, 11/700, PDP-11CL, 11/700
PDP-11CM, 11/700, PDP-11CM, 11/700
PDP-11CN, 11/700, PDP-11CN, 11/700
PDP-11CO, 11/700, PDP-11CO, 11/700
PDP-11CP, 11/700, PDP-11CP, 11/700
PDP-11CQ, 11/700, PDP-11CQ, 11/700
PDP-11CR, 11/700, PDP-11CR, 11/700
PDP-11CS, 11/700, PDP-11CS, 11/700
PDP-11CT, 11/700, PDP-11CT, 11/700
PDP-11CU, 11/700, PDP-11CU, 11/700
PDP-11CV, 11/700, PDP-11CV, 11/700
PDP-11CW, 11/700, PDP-11CW, 11/700
PDP-11CX, 11/700, PDP-11CX, 11/700
PDP-11CY, 11/700, PDP-11CY, 11/700
PDP-11CZ, 11/700, PDP-11CZ, 11/700
PDP-11DA, 11/700, PDP-11DA, 11/700
PDP-11DB, 11/700, PDP-11DB, 11/700
PDP-11DC, 11/700, PDP-11DC, 11/700
PDP-11DD, 11/700, PDP-11DD, 11/700
PDP-11DE, 11/700, PDP-11DE, 11/700
PDP-11DF, 11/700, PDP-11DF, 11/700
PDP-11DG, 11/700, PDP-11DG, 11/700
PDP-11DH, 11/700, PDP-11DH, 11/700
PDP-11DI, 11/700, PDP-11DI, 11/700
PDP-11DJ, 11/700, PDP-11DJ, 11/700
PDP-11DK, 11/700, PDP-11DK, 11/700
PDP-11DL, 11/700, PDP-11DL, 11/700
PDP-11DM, 11/700, PDP-11DM, 11/700
PDP-11DN, 11/700, PDP-11DN, 11/700
PDP-11DO, 11/700, PDP-11DO, 11/700
PDP-11DP, 11/700, PDP-11DP, 11/700
PDP-11DQ, 11/700, PDP-11DQ, 11/700
PDP-11DR, 11/700, PDP-11DR, 11/700
PDP-11DS, 11/700, PDP-11DS, 11/700
PDP-11DT, 11/700, PDP-11DT, 11/700
PDP-11DU, 11/700, PDP-11DU, 11/700
PDP-11DV, 11/700, PDP-11DV, 11/700
PDP-11DW, 11/700, PDP-11DW, 11/700
PDP-11DX, 11/700, PDP-11DX, 11/700
PDP-11DY, 11/700, PDP-11DY, 11/700
PDP-11DZ, 11/700, PDP-11DZ, 11/700
PDP-11EA, 11/700, PDP-11EA, 11/700
PDP-11EB, 11/700, PDP-11EB, 11/700
PDP-11EC, 11/700, PDP-11EC, 11/700
PDP-11ED, 11/700, PDP-11ED, 11/700
PDP-11EE, 11/700, PDP-11EE, 11/700
PDP-11EF, 11/700, PDP-11EF, 11/700
PDP-11EG, 11/700, PDP-11EG, 11/700
PDP-11EH, 11/700, PDP-11EH, 11/700
PDP-11EI, 11/700, PDP-11EI, 11/700
PDP-11EJ, 11/700, PDP-11EJ, 11/700
PDP-11EK, 11/700, PDP-11EK, 11/700
PDP-11EL, 11/700, PDP-11EL, 11/700
PDP-11EM, 11/700, PDP-11EM, 11/700
PDP-11EN, 11/700, PDP-11EN, 11/700
PDP-11EO, 11/700, PDP-11EO, 11/700
PDP-11EP, 11/700, PDP-11EP, 11/700
PDP-11EQ, 11/700, PDP-11EQ, 11/700
PDP-11ER, 11/700, PDP-11ER, 11/700
PDP-11ES, 11/700, PDP-11ES, 11/700
PDP-11ET, 11/700, PDP-11ET, 11/700
PDP-11EU, 11/700, PDP-11EU, 11/700
PDP-11EV, 11/700, PDP-11EV, 11/700
PDP-11EW, 11/700, PDP-11EW, 11/700
PDP-11EX, 11/700, PDP-11EX, 11/700
PDP-11EY, 11/700, PDP-11EY, 11/700
PDP-11EZ, 11/700, PDP-11EZ, 11/700
PDP-11FA, 11/700, PDP-11FA, 11/700
PDP-11FB, 11/700, PDP-11FB, 11/700
PDP-11FC, 11/700, PDP-11FC, 11/700
PDP-11FD, 11/700, PDP-11FD, 11/700
PDP-11FE, 11/700, PDP-11FE, 11/700
PDP-11FF, 11/700, PDP-11FF, 11/700
PDP-11FG, 11/700, PDP-11FG, 11/700
PDP-11FH, 11/700, PDP-11FH, 11/700
PDP-11FI, 11/700, PDP-11FI, 11/700
PDP-11FJ, 11/700, PDP-11FJ, 11/700
PDP-11FK, 11/700, PDP-11FK, 11/700
PDP-11FL, 11/700, PDP-11FL, 11/700
PDP-11FM, 11/700, PDP-11FM, 11/700
PDP-11FN, 11/700, PDP-11FN, 11/700
PDP-11FO, 11/700, PDP-11FO, 11/700
PDP-11FP, 11/700, PDP-11FP, 11/700
PDP-11FQ, 11/700, PDP-11FQ, 11/700
PDP-11FR, 11/700, PDP-11FR, 11/700
PDP-11FS, 11/700, PDP-11FS, 11/700
PDP-11FT, 11/700, PDP-11FT, 11/700
PDP-11FU, 11/700, PDP-11FU, 11/700
PDP-11FV, 11/700, PDP-11FV, 11/700
PDP-11FW, 11/700, PDP-11FW, 11/700
PDP-11FX, 11/700, PDP-11FX, 11/700
PDP-11FY, 11/700, PDP-11FY, 11/700
PDP-11FZ, 11/700, PDP-11FZ, 11/700
PDP-11GA, 11/700, PDP-11GA, 11/700
PDP-11GB, 11/700, PDP-11GB, 11/700
PDP-11GC, 11/700, PDP-11GC, 11/700
PDP-11GD, 11/700, PDP-11GD, 11/700
PDP-11GE, 11/700, PDP-11GE, 11/700
PDP-11GF, 11/700, PDP-11GF, 11/700
PDP-11GG, 11/700, PDP-11GG, 11/700
PDP-11GH, 11/700, PDP-11GH, 11/700
PDP-11GI, 11/700, PDP-11GI, 11/700
PDP-11GJ, 11/700, PDP-11GJ, 11/700
PDP-11GK, 11/700, PDP-11GK, 11/700
PDP-11GL, 11/700, PDP-11GL, 11/700
PDP-11GM, 11/700, PDP-11GM, 11/700
PDP-11GN, 11/700, PDP-11GN, 11/700
PDP-11GO, 11/700, PDP-11GO, 11/700
PDP-11GP, 11/700, PDP-11GP, 11/700
PDP-11GQ, 11/700, PDP-11GQ, 11/700
PDP-11GR, 11/700, PDP-11GR, 11/700
PDP-11GS, 11/700, PDP-11GS, 11/700
PDP-11GT, 11/700, PDP-11GT, 11/700
PDP-11GU, 11/700, PDP-11GU, 11/700
PDP-11GV, 11/700, PDP-11GV, 11/700
PDP-11GW, 11/700, PDP-11GW, 11/700
PDP-11GX, 11/700, PDP-11GX, 11/700
PDP-11GY, 11/700, PDP-11GY, 11/700
PDP-11GZ, 11/700, PDP-11GZ, 11/700
PDP-11HA, 11/700, PDP-11HA, 11/700
PDP-11HB, 11/700, PDP-11HB, 11/700
PDP-11HC, 11/700, PDP-11HC, 11/700
PDP-11HD, 11/700, PDP-11HD, 11/700
PDP-11HE, 11/700, PDP-11HE, 11/700
PDP-11HF, 11/700, PDP-11HF, 11/700
PDP-11HG, 11/700, PDP-11HG, 11/700
PDP-11HH, 11/700, PDP-11HH, 11/700
PDP-11HI, 11/700, PDP-11HI, 11/700
PDP-11HJ, 11/700, PDP-11HJ, 11/700
PDP-11HK, 11/700, PDP-11HK, 11/700
PDP-11HL, 11/700, PDP-11HL, 11/700
PDP-11HM, 11/700, PDP-11HM, 11/700
PDP-11HN, 11/700, PDP-11HN, 11/700
PDP-11HO, 11/700, PDP-11HO, 11/700
PDP-11HP, 11/700, PDP-11HP, 11/700
PDP-11HQ, 11/700, PDP-11HQ, 11/700
PDP-11HR, 11/700, PDP-11HR, 11/700
PDP-11HS, 11/700, PDP-11HS, 11/700
PDP-11HT, 11/700, PDP-11HT, 11/700
PDP-11HU, 11/700, PDP-11HU, 11/700
PDP-11HV, 11/700, PDP-11HV, 11/700
PDP-11HW, 11/700, PDP-11HW, 11/700
PDP-11HX, 11/700, PDP-11HX, 11/700
PDP-11HY, 11/700, PDP-11HY, 11/700
PDP-11HZ, 11/700, PDP-11HZ, 11/700
PDP-11IA, 11/700, PDP-11IA, 11/700
PDP-11IB, 11/700, PDP-11IB, 11/700
PDP-11IC, 11/700, PDP-11IC, 11/700
PDP-11ID, 11/700, PDP-11ID, 11/700
PDP-11IE, 11/700, PDP-11IE, 11/700
PDP-11IF, 11/700, PDP-11IF, 11/700
PDP-11IG, 11/700, PDP-11IG, 11/700
PDP-11IH, 11/700, PDP-11IH, 11/700
PDP-11II, 11/700, PDP-11II, 11/700
PDP-11IJ, 11/700, PDP-11IJ, 11/700
PDP-11IK, 11/700, PDP-11IK, 11/700
PDP-11IL, 11/700, PDP-11IL, 11/700
PDP-11IM, 11/700, PDP-11IM, 11/700
PDP-11IN, 11/700, PDP-11IN, 11/700
PDP-11IO, 11/700, PDP-11IO, 11/700
PDP-11IP, 11/700, PDP-11IP, 11/700
PDP-11IQ, 11/700, PDP-11IQ, 11/700
PDP-11IR, 11/700, PDP-11IR, 11/700
PDP-11IS, 11/700, PDP-11IS, 11/700
PDP-11IT, 11/700, PDP-11IT, 11/700
PDP-11IU, 11/700, PDP-11IU, 11/700
PDP-11IV, 11/700, PDP-11IV, 11/700
PDP-11IW, 11/700, PDP-11IW, 11/700
PDP-11IX, 11/700, PDP-11IX, 11/700
PDP-11IY, 11/700, PDP-11IY, 11/700
PDP-11IZ, 11/700, PDP-11IZ, 11/700
PDP-11JA, 11/700, PDP-11JA, 11/700
PDP-11JB, 11/700, PDP-11JB, 11/700
PDP-11JC, 11/700, PDP-11JC, 11/700
PDP-11JD, 11/700, PDP-11JD, 11/700
PDP-11JE, 11/700, PDP-11JE, 11/700
PDP-11JF, 11/700, PDP-11JF, 11/700
PDP-11JG, 11/700, PDP-11JG, 11/700
PDP-11JH, 11/700, PDP-11JH, 11/700
PDP-11JI, 11/700, PDP-11JI, 11/700
PDP-11JJ, 11/700, PDP-11JJ, 11/700
PDP-11JK, 11/700, PDP-11JK, 11/700
PDP-11JL, 11/700, PDP-11JL, 11/700
PDP-11JM, 11/700, PDP-11JM, 11/700
PDP-11JN, 11/700, PDP-11JN, 11/700
PDP-11JO, 11/700, PDP-11JO, 11/700
PDP-11JP, 11/700, PDP-11JP, 11/700
PDP-11JQ, 11/700, PDP-11JQ, 11/700
PDP-11JR, 11/700, PDP-11JR, 11/700
PDP-11JS, 11/700, PDP-11JS, 11/700
PDP-11JT, 11/700, PDP-11JT, 11/700
PDP-11JU, 11/700, PDP-11JU, 11/700
PDP-11JV, 11/700, PDP-11JV, 11/700
PDP-11JW, 11/700, PDP-11JW, 11/700
PDP-11JX, 11/700, PDP-11JX, 11/700
PDP-11JY, 11/700, PDP-11JY, 11/700
PDP-11JZ, 11/700, PDP-11JZ, 11/700
PDP-11KA, 11/700, PDP-11KA, 11/700
PDP-11KB, 11/700, PDP-11KB, 11/700
PDP-11KC, 11/700, PDP-11KC, 11/700
PDP-11KD, 11/700, PDP-11KD, 11/700
PDP-11KE, 11/700, PDP-11KE, 11/700
PDP-11KF, 11/700, PDP-11KF, 11/700
PDP-11KG, 11/700, PDP-11KG, 11/700
PDP-11KH, 11/700, PDP-11KH, 11/700
PDP-11KI, 11/700, PDP-11KI, 11/700
PDP-11KJ, 11/700, PDP-11KJ, 11/700
PDP-11KK, 11/700, PDP-11KK, 11/700
PDP-11KL, 11/700, PDP-11KL, 11/700
PDP-11KM, 11/700, PDP-11KM, 11/700
PDP-11KN, 11/700, PDP-11KN, 11/700
PDP-11KO, 11/700, PDP-11KO, 11/700
PDP-11KP, 11/700, PDP-11KP, 11/700
PDP-11KQ, 11/700, PDP-11KQ, 11/700
PDP-11KR, 1

Computerworld Sales Offices

West President/John F. Pagan
 Director/Robert J. Pagan
 Manager/Charles E. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701
 (617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
 Eastern Regional Manager/Robert J. Pagan
 Boston Manager/John F. Pagan
 Boston Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

CHICAGO SALES OFFICE (312) 879-0700
 Eastern Regional Manager/Robert J. Pagan
 Chicago Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

NEW YORK SALES OFFICE (212) 879-0700
 Eastern Regional Manager/Robert J. Pagan
 New York Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

LOS ANGELES SALES OFFICE (714) 879-0700
 Eastern Regional Manager/Robert J. Pagan
 Los Angeles Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

SAN FRANCISCO SALES OFFICE (415) 421-7200
 Eastern Regional Manager/Robert J. Pagan
 San Francisco Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

ATLANTA SALES OFFICE (404) 384-0700
 Eastern Regional Manager/Robert J. Pagan
 Atlanta Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

HOUSTON SALES OFFICE (713) 879-0700
 Eastern Regional Manager/Robert J. Pagan
 Houston Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

CLASSIFIED ADVERTISING (617) 879-0700
 Classified Advertising Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
 General Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701
 (617) 879-0700
 Manager/John F. Pagan
 Computerworld, 375 Cambridge Road, Box 800,
 Framingham, MA 01701

CW COMMUNICATIONS, INC.

Second Chairman/Publisher

President

Senior Vice-President

Senior Vice-President

Senior Vice-President

Group VP-Communications Services, Sam Eamonson, Group VP-Production, Margaret Pagan,
 VP-Advertising, David C. Pagan, VP-Promotion, William P. Murphy, VP-Sales, John W. Winters,
 Computerworld Headquarters: 375 Cambridge Road, P.O. Box 800, Framingham, MA 01701
 Phone: (617) 879-0700, Telex: 80-1183

SALES
 Vice-President, David C. Pagan, National Director, Edward P. Morski, Regional
 Advertising Administrator, Philip C. O'Brien, Manager/Marketing & Sales Operations,
 Kathy Doyle
 Deputy Advertising Administrator, John Hickey
 Deputy Advertising Administrator, David Pagan, Team Managers, Carolyn Madsen, Chay Chuk, John
 W. Winters, Classified Services Manager, Cynthia DeLong

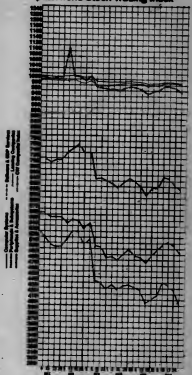
Group Vice-President, Jack Eamonson, Director Research, Kathryn DeLong
 Sales Promotion Director, Liz Johnson
 Group Vice-President, Jack Eamonson, Director Research, Kathryn DeLong

Production Director, Peter Hahn, Production Manager, Margaret Pagan
 Photo-Editor, John Hickey, Systems Manager, Tom Pagan
 Typographical Director, Carol Pagan, Art Director, John Hickey
 Graphic Designer, John Pagan

Group Vice-President, Margaret Pagan, Director Manager, John Hickey

Computerworld is an equal opportunity employer. Minorities and women are encouraged to apply. Computerworld is an equal opportunity employer. Minorities and women are encouraged to apply.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All figures compiled
 Computerworld
 TRADE QUOTES INC.
 Cambridge, Mass. 02142

| TRADE QUOTES - MAY 1973 | | | | | | | | | | TRADE QUOTES - MAY 1973 | | | | | | | | | |
|-------------------------|--|--|--|--|--|--|--|--|--|-------------------------|--|--|--|--|--|--|--|--|--|
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |
| 1972-73 | | | | | | | | | | 1971-72 | | | | | | | | | |

WHEN IT COMES TO LINKING PC's TO MAINFRAMES, ONE COMPANY IS A MILLENNIUM AHEAD.



You don't have to look hard to see why McCormack & Dodge has linked more PC's to more mainframes than any other business software vendor.

It's a classic case of a superior product leading to superior sales.

To begin with, our link does more than just link. It works like you do. Selectively. Analytically. And in real time—so that company decision-makers always have the freshest, latest data available. Current and accurate up to the second you display it on your PC screen.

If you've tried out other PC links, you'll notice the M&D difference the moment you start downloading information from the mainframe to your desk. For example, you'll see that you can access all applications, no matter who designed them—not just those designed by McCormack & Dodge. And you'll discover the ease of working with a system that lets you pinpoint and selectively summon exactly the portion of data you need.

Once you've called the data down to your PC, the Lotus 1-2-3 software in our link lets you crunch numbers backwards, forwards, up and down—anywhere your mind wants to take them. You can instantly construct detailed spreadsheets. You create brilliant color graphs.

And the moment you finish massaging the data to your liking, our link lets you shoot it back to the mainframe (assuming you have the proper security clearance). You do it yourself on the spot—in real time. Without keyboard operators or programmers. So the entire company has the benefit of the latest information immediately. Not days later.

The M&D PC link is one of several products in our highly acclaimed Millennium family of borderless business software. When you compare the entire Millennium concept to anything else claiming "total integration," you'll see that M&D isn't just out-linking the competition. We're out-thinking them.

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

A COMPANY OF
THE DATA RESOURCES CORPORATION